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Materials for a Flora of the Malayan Peninsula.—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 14.

The present contribution contains an account by Mr. Gamble of the few species belonging to the Natural Order *Caprifoliaceæ*, which have so far been collected in the Malay Peninsula and adjacent Islands. But the larger part of it is occupied by a joint account by the authors of the species of the Order *Rubiaceæ*, which are characterised by having more ovules than one in each cell of the ovary. The key which precedes the text is only for these genera. In a paper which the authors hope soon to submit to the Society they will deal with the species of the genera which have only a single ovule in each ovarian cell; and that paper will, in like manner, be preceded by a key to these uniovular genera.

With the exception of the important family of *Leguminosæ*, which was elaborated entirely by Major D. Prain, of the Botanic Garden, Calcutta, and of one genus of *Melastomaceæ*, which was done in conjunction with Dr. O. Stapf, chief assistant in the Kew Herbarium, the whole of the orders dealt with in the preceding thirteen parts of these *Materials* have been worked out by Sir George King. With the view of expedit-

ing the completion of the series, and in consideration of the liberality of the Government of the Straits Settlements which has made feasible a more rapid rate of publication, it has been arranged that Mr. J. S. Gamble will henceforth, in the majority of the orders belonging to *Corollifloræ* and *Incompletæ*, work in collaboration with Sir George King; while certain orders will be worked out independently by botanical friends, who have kindly promised their aid.

Order LVIII. CAPRIFOLIACEÆ.

Small trees or shrubs, erect or climbing, rarely herbs. *Leaves* opposite, rarely alternate, simple, lobed or imparipinnate; stipules usually absent. *Inflorescence* various, usually cymose; flowers hermaphrodite, regular or irregular. *Calyx* adnate to the ovary; lobes 5, superior, usually imbricate, rarely valvate. *Corolla* superior, gamopetalous, tubular, funnel-shaped or rotate; limb 5-fid, lobes imbricate. *Stamens* 5, rarely 4, inserted on the corolla-tube, alternate with the lobes; filaments filiform or subulate; anthers 2-celled, introrse, longitudinally dehiscent. *Ovary* inferior, 2-6-, rarely 1-celled; style terminal, stigma capitate, undivided or bifid, sometimes short and 3-lobed; ovules sometimes solitary, pendulous, sometimes many, biseriate, anatropous. *Fruit* a berry or drupe or sometimes dry and indehiscent, many-celled, 1- to many-seeded. *Seeds* single or many in each cell; testa crustaceous or hard; albumen fleshy, copious; embryo usually minute, ovoid or clavate, 2-fid, radicle smooth, cotyledons ovate.—*DISTRIB.* Genera 13, species 200 to 220; chiefly found in the Northern Hemisphere more especially in temperate regions; a few in Australia and South America; none in tropical or Southern Africa.

VIBURNUM, Linn.

Shrubs or small trees. *Leaves* opposite, rarely alternately verticillate, simple, petiolate; entire, serrate or dentate, sometimes palmately lobed; sometimes stellately pubescent, sometimes gland-dotted; stipules usually inconspicuous or absent, in a few cases very large. *Flowers* hermaphrodite, in terminal or subterminal subumbellate corymbs, the branches cymose or paniced; bracts few, small; bracteoles 1 to 2, usually very small, generally quickly deciduous. *Calyx-tube* turbinate, cylindric or clavate; limb short, 5-toothed, persistent. *Corolla* white, pink or yellowish; rotate, campanulate or tubular; lobes 5, equal, imbricate. *Stamens* 5, inserted on the corolla, alternate with the lobes; anthers oblong, usually exserted; filaments linear or subulate. *Ovary* 1-3-celled; style short, conical, stigma small, obscurely 3-lobed; ovules solitary in the cells, pendulous. *Fruit* a drupe 1- or rarely 2-3-celled, 1-seeded; endocarp tough, papery or crustaceous. *Seed* oblong, com-

pressed, grooved, the edges sometimes incurved; testa membranaceous; albumen fleshy, sometimes ruminant; embryo minute, cotyledons thin.—
 DISTRIB. Species over 80, chiefly of the temperate and sub-temperate regions of the Northern Hemisphere in Europe and Asia; a few in the West Indies, South America and Madagascar.

Leaves entire :—

Corolla rotate; filaments long, linear; calyx-tube
 pubescent 1. *V. sambucinum*.

Corolla tubular; filaments short, subulate; calyx-
 tube glabrous 2. *V. Beccarii*.

Leaves dentate or serrate; calyx-tube glabrous 3. *V. lutescens*.

1. *VIBURNUM SAMBUCINUM*, Reinw.; Blume Bijdr. 656. A large shrub or small tree up to 30 feet high; young branches stout, smooth, somewhat angled; youngest parts and branches of the inflorescence brown, stellate-pubescent. *Leaves* opposite, entire, thinly coriaceous, elliptic-oblong or -lanceolate, abruptly acuminate, the base cuneate; both surfaces glabrous except for a few hairs on the midrib beneath and occasional tufts in the axils of the main-nerves; main-nerves 4-6 pairs, prominent, curved upwards, joined by prominent arches near the margin, lesser nerves reticulate; length 5 to 10 in., breadth 1·5 to 4 in., petiole ·75 to 1·25 in., pilose especially on the inner surface. *Corymb* terminal, usually peduncled but sometimes nearly sessile, umbellate, primary branches 6 to 8 and ·5 to 1 in. long, upper cymosely branched, short in flower, longer in fruit; bracts of primary branches very early deciduous, linear-spathulate, ·2 to ·3 in. long, bracteoles also very deciduous, very short, linear-oblong, densely brown stellate-pubescent. *Calyx*-tube cylindrical, ·05 in. long, pubescent; lobes 5 spreading, lanceolate-acute. *Corolla* hemispheric in bud, rotate when open; lobes 5, rounded, imbricate, yellow-white. *Stamens* 5; anthers oblong, exerted; filaments longer than the petals, much folded in bud. *Ovary* 1-celled, style conical. *Fruit* a drupe, broadly ovate, suddenly acute, compressed, wrinkled, 2-grooved on one and 3-grooved on the other face, ·35 in. long, ·2 in. broad, endocarp thick, osseous. DC. Prodr. IV. 325; Miq. Fl. Ind. Bat. II. (1856) 120; Oersted in Vidensk. Meddel. (1860) 299, t. 7, figs. 11-13; C. B. Clarke in Hook. fil. Fl. Br. Ind. III. 5; Koord. & Val. Boomsoort. Java in Mededeel. 'sLands Plant. XXXIII. (1900) 40. *V. integerrimum*, Wall. Cat. 457; DC. Prodr. IV. 324; Hook. fil. and Th. in Journ. Linn. Soc. II. 476. *Premna* (?), Wall. Cat. 9077.

PERAK: Wray 1237, 1483, 2951; *Scortechini* 514. PENANG: Wall. 457; Walker 92, 272; *Maingay* (K.D.) 712/2; *King's Collector* 1586, 2273, 5202; *Curtis* 278. MALACCA: *Griffith* 3395. SINGAPORE: *Ridley* 6335. DISTRIB. Sumatra; Java; Borneo.

The Perak specimens show two forms, the one (No. 1483 *Wray*) with leaves elliptic-oblong, glabrous beneath; the other (No. 2951 *Wray*) with smaller leaves elliptic-lanceolate, with occasional stellate hairs beneath. Other specimens from various localities show intermediate forms so that they are not constant varieties.

2. *VIBURNUM BECCARI*, Gamble n. sp. Apparently a small tree, young branches rather thick, smooth. *Leaves* opposite, entire, coriaceous, ovate, obtuse or very shortly and bluntly acute, base cuneate; glabrous above, minutely glandular-dotted beneath; main-nerves 4 to 6 pairs, smaller nerves reticulate; length 3 to 5 in., breadth 2 to 3 in., petiole .75 to 1.25 in. *Corymb* terminal, long-peduncled (1.5 to 3 in.), umbellate, main branches 6 to 8, upper branches cymose, all brown stellate-pubescent when young; bracts and bracteoles small, linear, very numerous, rusty stellate-pubescent, very quickly deciduous. *Calyx*-tube clavate, glabrous, .1 in. long; teeth very minute. *Corolla* tubular, ovoid in bud, .15 in. long; teeth 5, acute. *Stamens* 5; anthers oblong, pendulous from the summit of a subulate thickened filament, .075 in. long. *Ovary* 1-celled; style short, conical. *Fruit* (young only) a drupe, 1-celled, faintly 1-grooved on one face, 2-grooved on the other.

PERAK: *Scortechini* 375b. *DISTRIB.* Sumatra (*Beccari* No. 194 on Mt. Singalan in Herb. Kew).

Specimens of the fully opened corolla or of the mature fruit are not yet available.

3. *VIBURNUM LUTESCENS*, Blume Bijdr. 655 (1825). A small tree, young branches slender, smooth, youngest parts and branches of the inflorescence brown, stellately-pubescent. *Leaves* opposite, ovate-acuminate, thinly coriaceous, cuneate at base, upper two-thirds deeply creuate-dentate, sometimes serrate, teeth mucronate, lower one-third entire; both surfaces glabrous; main-nerves 6 to 8 pairs, ascending, prominent, lesser nerves reticulate; length 3 to 5 in., breadth 1.5 to 2.5 in., petiole .5 to .75, rough when dry. *Corymb* terminal, long-peduncled (1.5 to 2.5 in.), umbellate, primary branches 3 to 6 and .5 to .75 in. long, paniculate-cymosely branched above; bracts of primary branches deciduous, linear-spathulate, .4 to .5 in. long, bracteoles very minute, ovate-acuminate, both stellately brown-pubescent. *Calyx*-tube angular, glabrous, .05 in. long; lobes 5, erect, ovate, bluntly acute. *Corolla* hemispheric in bud, rotate-campanulate when open; lobes 5, rounded, imbricate, white. *Stamens* 5; anthers oblong, exerted; filaments short, equal to the petals. *Ovary* 1-celled; style short, conical, faintly 3-lobed. *Fruit* a drupe, oblong-ellipsoid, abruptly apiculate, compressed, 1-grooved on one and 2-grooved on the other face, .3 to .4 in. long, .2 in. broad; endocarp thick, hard. DC. Prodr. IV. 325, *V. monogynum*, Blume Bijdr. 655; DC. Prodr. IV. 327. *V. sundaicum*,

Miq. Fl. Ind. Bat. II. (1856) 121; Koord. & Val. Boomscoort. Java in Mededeel. 's Lands Plant. XXXIII. (1900) 43.

PERAK: *Wray* 1496, at 4900 feet on Ulu Batang Padang. **DISTRIB.** Sumatra; Java.

Nat. Ord. LIX. RUBIACEÆ.

Trees, shrubs or herbs, erect, climbing, twining or prostrate, unarmed or spinous. *Leaves* simple, opposite, usually quite entire; stipules inter- or intra-petiolar, free or united to each other or to the petiole; in the tribe *Galiææ* leaf-like and forming a whorl with the leaves. *Inflorescence* various. *Flowers* usually hermaphrodite, mostly regular and symmetrical. *Calyx-tube* adnate to the ovary: its limb various, sometimes petaloid. *Corolla* gamopetalous, regular, usually 4-5-lobed, rarely bilabiate; the lobes of the limb valvate, imbricate or contorted. *Stamens* equal in number to the lobes of the corolla, sessile or on short or long filaments; *anthers* 2-celled, usually linear, dorsifixed, and dehiscing longitudinally, rarely with porous dehiscence. *Disk* epigynous, usually annular or cushion-shaped, sometimes lobed, or reduced to glands. *Ovary* inferior, 1-10-celled; style simple or cleft (but rarely cleft to the base); stigmas various, usually on the style-arms, but sometimes connate and fusiform, oblong, capitate or mitriform and simple or lobed. *Ovules* in the ovarian cells solitary or in pairs, or numerous. *Fruit* capsular, baccate, drupe-like, 2-10-celled, or dehiscing into 2 or more dehiscent or indehiscent cocci. *Seeds* various, with horny albumen; embryo straight or curved; cotyledons flat or semi-terete; radicle superior or inferior.—**DISTRIB.** About 4,800 species, chiefly tropical and sub-tropical.

Ovules numerous in each cell of the ovary:—

Fruit dry, capsular or separating into 2 or 4 cocci:—

Flowers collected into dense globular heads: corolla funnel-shaped, its lobes valvate or imbricate in bud: stigma simple:—

Lobes of the corolla valvate	...	...	1. MITRAGYNE.
Lobes of the corolla imbricate:—			
Tubes of the calyces concrete	...	...	2. SARCOCEPHALUS.
Tubes of the calyces free:—			
Seeds not winged	...	...	3. ANTHOCEPHALUS.
Seeds winged:—			
Trees:—			
Capitules solitary or few	...	...	4. NAUCLEA.
Capitules numerous, small	...	...	5. ADINA.
Climbers:—			
Capitules usually solitary, axillary, on peduncles curving into hooks when in fruit	...	...	6. UNCARIA.

Flowers in corymbs or panicles, not in globular heads; corolla-lobes valvate, imbricate or contorted in bud. Fruit capsular, 2-celled, seeds winged:—

Corolla funnel-shaped, its lobes twisted in bud; flowers in terminal pendulous panicles; lobes of calyx equal, not petaloid: stigma simple fusiform... 7. COPTOSAPelta.

Corolla with a short tube, its lobes slightly twisted in bud; flowers stalked, in erect corymbs or panicles; one of the lobes of the calyx sometimes large, petaloid and persistent; stigma fleshy, 2-lobed ... 8. MUSSAENDOPSIS.

Flowers in subscorpioid cymes: corolla funnel-shaped, its lobes valvate, but somewhat twisted in bud; capsule 2-celled; seeds numerous, obscurely winged; stigmas 2 linear, revolute 9. GREENIA.

Corolla and inflorescence various, corolla-lobes valvate in bud. Stamens 4 or 5. *Fruit* a loculi- or septical capsule with 2 or 4 cells, or consisting of 2 or 4 adnate dry dehiscent or indehiscent (rarely quite indehiscent) cocci; seeds small or minute, rarely winged. Herbs or small shrubs (never trees) with entire leaves:—

Fruit 2-celled, usually indehiscent: stipules entire:—

Corolla funnel-shaped, 4- or 5-toothed; anthers included, dehiscing longitudinally 10. DENTELLA.

Corolla rotate; anthers large, exerted, connivent, dehiscing by apical pores 11. ARGOSTEMMA.

Fruit oblong, sub-globose, or orbicular, 2- rarely 4-celled, usually dehiscent, many-seeded, rarely 1-seeded: stipules often divided into bristles:—

Corolla funnel-shaped or campanulate, 4-lobed; capsule loculi- or septical, rarely indehiscent; calyx-teeth contiguous; seeds usually angular ... 12. HEDYOTIS.

Corolla rotate, funnel- or salver-shaped, 4- rarely 5-lobed; capsule loculicidal above the remote calyx-teeth, rarely indehiscent; seeds minute, angular 13. OLDENLANDIA.

Fruit broadly and didymously obcordate, compressed, composed of 2 spreading lobes, loculicidal above the calyx; flowers secund on the branches of dichotomous cymes 14. OPHIORRHIZA.

Fruit fleshy, dehiscing irregularly or at the apex, or drupe-like and separating into 2 or more many-seeded cocci:—

Flowers in capitula:—

Capitula without involucre: calyx entire: stamens 4 15. LUCINAEA.

Capitula involucre; calyx obliquely campanulate, obtusely 2-4-lobed or 2-lipped: stamens 5; climbing shrubs 16. LECANANTHUS.

- Capitula bracteate, crowded; calyx with 5 ciliate lobes; corolla 5-lobed; stamens 5; arms of style 2, truncate; berry with thin pericarp; herbaceous 17. **COPTOPHYLLUM.**
- Flowers in terminal corymbs or racemes: one of the calyx-lobes occasionally long, petaloid, persistent; erect or scandent shrubs 18. **MUSSAENDA.**
- Flowers in paniced terminal umbels; calyx-limb cupular, deciduous; corolla 5-lobed; stamens 5; arms of style linear-lanceolate; woody scandent shrubs ... 19. **TRISCIADIA.**
- Flowers in axillary cymes; shrubs or small trees:—
- Flowers polygamous; cymes paniced; lobes of calyx and corolla and the stamens 8 to 16; disc large, convex, with as many lobes as the stamens and stigma 20. **AULACOODISCUS.**
- Flowers hermaphrodite:—
- Cymes short, few-flowered; calyx minutely toothed; fruit with scanty pulp 21. **UROPHYLLUM.**
- Cymes loose; flowers 4-5-merous; lobes of corolla reduplicate-valvate; fruit baccate, fleshy, 2-5 celled 22. **ADENOSACME.**
- Corolla-lobes twisted in bud; fruit baccate, fleshy or dry; seeds usually large, cotyledons often foliaceous:—
- Seeds numerous in each cell of the fruit:—
- Flowers dioecious:—
- Cymes from the axils of fallen or undeveloped leaves; style arms 2; berries with thin pericarp, ellipsoid or globular 23. **BRACHYTOME.**
- Flowers hermaphrodite:—
- Flowers in cymes:—
- Cymes terminal, corymbose; flowers 5-merous; stigma simple, fusiform; fruit pisiform, 2-celled 24. **STYLOCORYNA.**
- Cymes usually axillary; stigma fusiform or bifid; fruit baccate with thick pericarp:—
- Calyx-limb various; fruit 2-celled ... 25. **RANDIA.**
- Calyx-limb usually tubular; fruit 1-celled ... 26. **GARDENIA.**
- Flowers in spikes:—
- Calyx-limb minutely 5-toothed; anthers thickened at the apex 27. **PETUNGA.**
- Ovules and seeds 2 or 3 in each cell:—
- Flowers in axillary fascicles on small cymes; calyx-limb truncate or 4-5-toothed; fruit baccate, ovoid or globose, sessile 28. **DIPLOSPORA.**
- Ovules never more than 2 in each cell of the two-celled ovary:—
- Corolla-lobes twisted; ovules inserted together half-way up the ovarian cell, one pendulous, the other erect; flowers in dense axillary pedunculate cymes; a small littoral tree 29. **SCYPHIHORA.**

Corolla-lobes valvate; ovules erect, on the top of an erect basilar placenta; flowers in scorpioid cymes, collected in corymbose panicles 30. JACKIA.

1. MITRAGYNA, Korthals.

Trees with petiolate leaves and large caducous bracts and stipules. *Flowers* sessile, crowded in globose, solitary or paniculate, pedunculate capitules, each peduncle with 2 foliaceous long-petioled bracts near its apex: the flowers mixed in the capitules with numerous, spatulate paleaceous bracteoles. *Calyces* conoid, densely crowded, but quite separable from each other: the calyx-tube short, its mouth truncate or 5-toothed. *Corolla* funnel-shaped; the tube long, the mouth with a ring of villose hairs inside below the base of the lobes; lobes 5, thickened towards the apex, lanceolate, valvate in aestivation. *Stamens* 5, originating just above the ring of hairs; *anthers* lanceolate, apiculate, cordate or sagittate at the base; filaments short. *Ovary* 2-celled; *style* filiform, exserted; *stigma* cylindrical or mitriform, its base overlapping the apex of the style; *ovules* numerous, on pendulous placentas. *Fruit* of two 5-ridged cocci dehiscing at the apex. *Seeds* numerous, small; the testa with thin wings, the albumen fleshy.—DISTRIB. Eight species, 5 of which are Indo-Malayan and 3 tropical African.

Main-nerves of leaves 7 to 9 pairs; corolla .2 in. long;
calyx-tube narrow, not ridged 1. *M. diversifolia*.
Main-nerves of leaves 12 to 15 pairs; corolla .3 in.
long; calyx-tube wide, ridged 2. *M. speciosa*.

1. MITRAGYNA DIVERSIFOLIA, Haviland in Journ. Linn. Soc. XXXIII. 71. Young branches pale, compressed. *Leaves* thickly membranous, ovate or elliptic, to rotund-ovate; obtuse or sub-acute; the base rounded (in the lower leaves slightly cordate); both surfaces glabrous, the lower minutely reticulate, sometimes puberulous especially on the nerves; main-nerves 7 to 9 pairs, rather straight, spreading; length 4 to 8 in.; breadth 2 to 6 in.; petiole .35 to 1.25 in.; *stipules* oblong, blunt. *Corolla* .2 in. long; tube of *calyx* not ridged, about .025 in. wide. *Anthers* cordate at the base. *Stigma* cylindrical, overlapping the apex of the style by its hollow base. *Mitragyne javanica*, Koord. & Valet. Bijdr. 8, 38. *Stephegyne diversifolia*, Hook. fil. Fl. Br. Ind. III. 26. *S. parvifolia*, Korth. Verh. Nat. Gesch., p. 161 (in part). *Nauclea diversifolia*, Wall. Cat. 6096: G. Don Gen. Syst. III. 467. *N. rotundifolia*, Roxb. Fl. Ind. I. 516; Kurz For. Fl. Burm. II. 67. *N. Brunonis*, Wall. Cat. 6097: G. Don, l.c. *N. parvifolia*, Roxb. var. 2, Kurz For. Fl. Burm. II. 67.

ANDAMAN ISLANDS.—DISTRIB. Burma; Chittagong; Philippines.

The occurrence of this in a wild state in the Malay Peninsula is doubtful. In the Andaman islands it is common.

The stigma of this is externally almost cylindrical. But it is hollowed at the base like a wine-bottle and covers the apex of the style like a cap. The leaves of the upper part of the branches are smaller and more or less ovoid in form; those of the lower parts are larger and more rotund, hence the specific name. Roxburgh, thinking only of the lower leaves, named the species *Nauclea rotundifolia*.

2. MITRAGYNA SPECIOSA, Korth. Obs. de Naucleés Indicês, p. 19 (name only). Young branches usually dark-coloured, compressed. *Leaves* membranous, oblong-obovate to oblong, shortly and abruptly acuminate or sub-acute, the base broad and rounded or rarely slightly and suddenly contracted; both surfaces glabrous, the lower minutely reticulate and sometimes puberulous on the 12 to 15 pairs of slightly curved ascending nerves; length 4 to 5·5 in.; breadth 2 to 3·5 in.; petiole thin, ·8 to 1·2 in. long; *stipules* lanceolate, sparsely pubescent. *Corolla* ·3 in. long; tube of calyx wide, ridged, its mouth about ·075 in. across. *Anthers* sagittate at the base. *Stigma* mitriform. Haviland in Journ. Linn. Soc. XXXIII. 69. *Stephegyne speciosa*, Korth. Verh. Nat. Gesch. Bot., p. 160. *S. parvifolia*, K. Schum. Fl. Kaiser-Wilh. Land., p. 127. *Nauclea speciosa*, Miq. Fl. Ind. Bat. II. 140.

PAHANG: *Ridley* 2190. PERAK: *Wray* 1896, 4280; PERAK: *Scortechini* 616; *King's Collector* 1770, 10021, 10459.—DISTRIB. Sumatra, *Forbes*, Borneo; *Motley* 1169; *Korthals*, Philippines; *Cuming*; *Motley*; *Vidal*; New Guinea.

2. SARCOCEPHALUS, Afzel.

Shrubs or trees with petiolate leaves and small or large caducous or persistent stipules. *Flowers* sessile, conjoined by their confluent calyx-tubes into globose, axillary or terminal, pedunculate, ebracteolate heads, the peduncles with 2 small bracts near or below the middle. *Calyx-tube* short; its mouth with 4 or 5 imbricate, persistent or caducous teeth. *Corolla* infundibuliform; its mouth with 4 or 5 broad, blunt, imbricate teeth not thickened near the apex. *Stamens* 4 or 5, inserted in the glabrous throat of the corolla by very short filaments, or sessile; *anthers* broadly ovate. *Stigma* clavate, fusiform or capitate, exserted, the *style* long, filiform. *Ovary* 2-celled; ovules numerous, on two pendulous placentas. *Fruits* combined into a globose fleshy mass of 2-celled pyrenes, with thin septa. *Seeds* ovoid, compressed, not winged; testa crustaceous; albumen fleshy.—DISTRIB. About a dozen species, mostly Indo-Malayan; one Australian and one African.

Leaves pubescent beneath: capitules about ·8 in. in
diam.

... 1. *S. hirsutus*.

Leaves minutely scaly beneath, more or less obovate;
 capitules 1·5 in. in diam. 2. *S. Maingayi.*

Leaves quite glabrous:—

Leaves oblong-lanceolate to elliptic-oblong; capi-
 tules ·5 to ·75 in. in diam. 3. *S. subditus.*

Leaves more or less obovate; capitules ·5 in. in
 diam. 4. *S. Junghuhnii.*

1. SARCOCEPHALUS HIRSUTUS, Havil. in Journ. Linn. Soc. XXXIII.

32. A tree: young branches slender, pubescent, the bark pale. *Leaves* thickly membranous, oblong-oblancoelate, shortly and abruptly acuminate, the base attenuate: upper surface quite glabrous, shining, the lower with short pubescence on the nerves and midrib, otherwise minutely scaly; main-nerves 7 to 9 pairs, ascending, slightly prominent on the lower surface; length 3 to 5 in.; breadth 1·5 to 2·25 in. petiole ·2 to ·3 in., pubescent; *stipules* oblong-oblancoelate, obtuse, ·3 in. long. *Peduncle* solitary, terminal, about 1 in. long, with 2 lanceolate small bracts about the middle. *Capitules* about ·8 in. in diam. *Calyx* very short; the limb truncate, hairy. *Corolla* infundibuliform, glabrous both outside and inside; the mouth with 4 rarely 5 broad rotund slightly obovate lobes. *Anthers* 4, broadly ovate not apiculate, cordate at the base, inserted at the base of the corolla-lobes by short broad filaments; numerous flattened and ridged imperfect flowers mixed with the perfect ones. *Style* shortly exserted, *stigma* cylindrical.

MALACCA: Ridley 3214.—DISTRIB. Borneo.

The Malacca specimens described above have their leaves more attenuate at the base and rather more hairy beneath than the Bornean type (Herb. Hav. 3406) on which Haviland founded the species. But in other respects they agree.

2. SARCOCEPHALUS MAINGAYI, Havil. in Journ. Linn. Soc. XXXIII.

33. A spreading tree, 40 to 80 feet high; young branches rather stout, yellowish-brown, glabrous. *Leaves* coriaceous, broadly elliptic or elliptic-obovate, shortly and abruptly acuminate, the base attenuate; upper surface quite glabrous, shining; the lower covered with minute white scales: main-nerves 9 to 14 pairs, impressed on the upper surface, prominent and sparsely puberulous on the lower; length 4 to 8 in.; breadth 2·25 to 3·5 in.; petiole ·5 to ·75 in., slightly winged; *stipules* oblong, sub-acute, thick, conjoined at the base, ·65 in. long. *Peduncles* solitary, terminal, short (·25 to ·5 in. long) bearing several oblong or lanceolate bracts, about ·5 in. in length. *Capitule* 1·5 in. in diam. *Calyx*-tube tomentose, 4-5-lobed. *Corolla* ·3 in. long, infundibuliform; the tube sub-glabrous; the lobes 4 or 5, lanceolate, pubescent on both surfaces. *Anthers* oblong, sub-acute, apiculate, filaments very short. *Style* exserted; *stigma* large, overlapping at its base the apex of the style. *Nauclea Maingayi*, Hook. fil. Fl. Br. Ind. II, 27.

MALACCA: *Maingay* (K.D.) 823. PERAK: *King's Collector* 4470, 4771, 6424, 7768, 7977, 10020, 10363; *Wray* 2043, 4173; *Scortechini* 265. SELANGOR: *Ridley* 2851. PROVINCE WELLESLEY: *Ridley* 9388.

3. SARCOCEPHALUS SUBDITUS, Miq. Fl. Ind. Bat. II. 133. A shrub or small tree; young branches slender, pale, the very youngest dark-coloured, glabrous. *Leaves* dark-coloured (when dry), thickly membranous, glabrous, oblong-oblong to elliptic-oblong, shortly and obtusely acuminate, the base cuneate; main-nerves 6 or 7 pairs, spreading; length 3 to 4·5 in.; breadth 1·25 to 2·5 in.; petiole ·2 to ·4 in. *Peduncles* usually solitary, slender, axillary or terminal, less than 1 in. long when in flower, longer in fruit, glabrescent or puberulous; bearing two small lanceolate bracts below the middle. *Capitules* ·5 to ·75 in. in diam. *Calyx-tube* short; the mouth expanded, truncate. *Corolla* with a narrow cylindrical tube; the mouth expanded into 4 broadly oblong or sub-obovate, obtuse lobes, slightly hairy on the inner surface; *anthers* ovate, almost sessile; *style* exerted, stigma clavate. *Syncarpium* globular, ·5 to ·75 in. in diam.; pale, covered with striate pits. *Seeds* black. Hook. fil. Fl. Br. Ind. II. 22; Havil. in Journ. Linn. Soc. XXXIII. 30; Koord. & Valet. Bijdr. 8, 16. *Platanocarpum subditum*; Korth. Verh. Nat. Gesch. 133, t. 32.

PERAK: *Scortechini*; *Wray* 4167; *King's Collector* 1073, 3027, 6646, 7812, 8854, 10436. SELANGOR: *Ridley* 10212. MALACCA: *Griffith* (K.D.) 1770, 2771.—DISTRIB. Sumatra; Borneo.

4. SARCOCEPHALUS JUNGHUHNII, Miq. Fl. Ind. Bat. II. 133. A tree, 40 or 50 feet high; young branches brown when dry. *Leaves* pale brown (when dry), thinly coriaceous, glabrous, elliptic to obovate-elliptic, abruptly, shortly and bluntly acuminate, the base more or less cuneate; main-nerves 5 to 7 pairs, curving upwards, prominent beneath; length 3·5 to 5·5 in.; breadth 1·65 to 3·5 in.; petiole ·35 to ·65 in. *Peduncles* axillary or terminal, solitary or in groups of three, from 1 to 1·5 in. long, with four small unequal, ovate-acute bracts below the middle, minutely pubescent. *Capitules* ·5 in. in diam. *Corolla* infundibuliform; its mouth with 4 large obovate-rotund blunt lobes, imbricate in aestivation, glabrous; *anthers* short, almost sessile, broadly ovate. *Style* exerted; *stigma* clavate. *Syncarpium* globular, covered with shallow striate pits. *Seeds* black. Hook. fil. Fl. Br. Ind. III. 23; Havil. in Journ. Linn. Soc. XXXIII. 29.

MALACCA: *Griffith* (K.D.) 2772; *Maingay* (K.D.) 822; *Derry* 1110, 1188. SINGAPORE: *Ridley* 2847, 2850, 2880, 3397, 6534, 6897. PENANG: *Curtis* 303; *Fox* 10674. PERAK: *Scortechini* 2166, 2105; *King's Collector* 4440, 4499, 8179, 8315.—DISTRIB. Sumatra; Borneo; Philippines; Cochin-China.

3. ANTHOCEPHALUS, A. Rich.

Large glabrous trees with petiolate coriaceous leaves and large caducous stipules. *Flowers* sessile, crowded in solitary terminal globose pedunculate heads, the peduncles bracteate at the base: the capitules ebracteolate. *Calyx* with a narrow cylindric tube expanding above and divided into 5 linear-oblong sparsely pubescent persistent lobes. *Corolla* tubular below, infundibuliform above, with 5 deep linear lobes, glabrous. *Anthers* linear-oblong, the apex apiculate. *Style* long, exserted; stigma elongate, cylindric, slightly fusiform. *Ovary* 2-celled; placentas linear, attached to the middle of the septum; *ovules* numerous. *Seeds* minute, ellipsoid; testa sub-membranous, albumen fleshy.—DISTRIB. 2 species both Indo-Malayan.

ANTHOCEPHALUS INDICUS, A. Rich. in Mém. Soc. Hist. Nat. Paris, 1834, p. 237. A tall tree; young branches slender, dark-coloured. *Leaves* elliptic, elliptic-oblong or ovate; the apex acute; the base cuneate or rounded, sometimes sub-oblique; upper surface glabrous, the lower sometimes puberulous; main-nerves 10 to 12 pairs, spreading, slightly prominent on both surfaces; length 5·5 to 8 in.; breadth 2·5 to 3·5 in.; petiole 1·2 to 1·75 in., somewhat winged near the apex; stipules triangular. *Capitules* 1 to 2 in. in diam.: their peduncles 1·5 to 2 in. long. *Calyx* short, tubular below, infundibuliform above and deeply divided into 5 narrowly oblong lobes with obtuse, somewhat thickened apices, glabrous. *Corolla* elongate, infundibuliform, glabrous; the teeth broadly lanceolate, sub-acute. *Anthers* 5, linear-oblong, apiculate, the filaments short. *Style* long, exserted; *stigma* large, fusiform. *Fruit* 4-celled, with thin walls, the upper part containing 4 cartilaginous, indehiscent several-seeded pyrenes, the lower part only 2-celled and containing numerous seeds. *A. indicus*, Koord. & Valet. Bijdr. 8, p. 8. *A. morindæfolius*, Korth. Verh. Nat. Gesch. 154, t. 48; Miq. Fl. Ind. Bat. II. 135. *A. Cadamba*, Miq. Fl. Ind. Bat. II. 135; Bedd. Fl. Sylv. 127; t. 35; Brand. For. Fl. N.-W. Ind. 261; Hook. fil. Fl. Br. Ind. III. 23. *Nauclea Cadamba*, Roxb. Hort. Beng. 14; Fl. Ind. II. 512. *Sarcocephalus Cadamba*, Kurz. For. Fl. Burm. II. 63; Wall. Cat. 6088 (excl. sheet C).

PERAK: *King's Collector* 6913. ANDAMAN ISLANDS: *Prain's Collector* 43, 93.—DISTRIB. British India; Malayan Archipelago.

A perusal of Richard's original description of *Anth. indicus* convinces one that the shrub which he describes is not *Nauclea purpurea*, Roxb., as he says, but *Nauclea Cadamba* of the same author.

4. NAUCLEA, Linn.

Trees or shrubs with petiolate or sessile, coriaceous or sub-coriaceous leaves, often of rather large size; the stipules caducous or sub-

persistent, large. *Flowers* sessile, in solitary or ternate, pedunculate heads; the peduncles often thickened near the apex and bearing caducous bracts, often of large size, mostly caducous; the flowers mixed with bracteoles consisting of long thin stalks and conical hairy heads, or ebracteolate. *Calyx*-tubes closely adpressed; but not united with each other; the lobes 5, deciduous, filiform or spatulate, often thickened at the apex and hairy, valvate in æstivation. *Corolla* infundibuliform; the lobes 5, short, imbricate, the throat glabrous. *Stamens* 5; the anthers oblong or linear, included in the tube of the corolla; filaments very short. *Style* elongate, rather stout: *stigma* sub-globose or globose-ovoid. *Ovary* 2-celled, the placentas pendulous; ovules imbricate. *Fruit* of 2 cocci, often separating from the persistent axis, dehiscent. *Seeds* flattened; the testa with a wing, bifid at one end, acute at the other.—**DISTRIB.** About 30 species mostly tropical and Indo-Malayan.

Lobes of corolla densely sericeous-strigose externally; peduncles solitary, short, each with 2 large sub-persistent bracts	1.	<i>N. Gageana.</i>
Lobes of corolla minutely glandular-puberulous externally; bracts of peduncle deciduous, minute	2.	<i>N. synkorynes.</i>
Lobes of corolla glabrous or nearly so:—		
Capitule enveloped in two large sub-persistent bracts	3.	<i>N. purpurascens.</i>
Bracts near the base of the capitule, small, deciduous	4.	<i>N. nicobarica.</i>
Bracts near the base of the peduncle, small, ternate, deciduous	5.	<i>N. peduncularis.</i>

1. NAUCLEA GAGEANA King. n. sp. A tree; young branches rather stout, slightly compressed, when dry pale-brown. *Leaves* coriaceous, broadly ovate-elliptic (sub-rhomboidal) gradually narrowed to the obtuse apex, the base cuneate; both surfaces quite glabrous, the upper shining (when dry); the lower dull, reticulate; main-nerve 8 to 10 pairs, spreading, prominent on the lower surface: the midrib very bold; length 6 to 8 in.; breadth 3·5 to 4·5 in.; petiole '6 to '8 in., flattened, winged in its upper part. *Capitules* about 1·5 in. in diam., solitary or in pairs. *Peduncles* 1 in. long, with a pair of large (1·25 in. long) sub-persistent bracts above the middle. *Calyx* short, cylindric, densely sericeous; the mouth very short, with 5 broad truncate lobes. *Corolla* infundibuliform, '4 to '5 in. long, outside glabrous in its lower, sericeous-strigose in its upper part; inside glabrous; lobes of the mouth 5, ovate. *Style* exerted, glabrous; *stigma* ovoid. *Fruit* villous. *Bracteoles* of the capitulum fusiform, villous.

ANDAMAN ISLANDS: King's Collector 463, Prain's Collector 76.

A very distinct species named in honour of Captain Gage, Curator of the Calcutta Herbarium, who was the first to recognise it as a hitherto undescribed species.

2. NAUCLEA SYNKORYNES, Korthals Verh. Nat. Gesch. 160. A tree 30 to 40 feet high; young branches thin, compressed, broad at the nodes, pale-coloured (when dry). *Leaves* thinly coriaceous, oblong-ovate or oblong-obovate or narrowly elliptic, shortly rather abruptly acuminate, the base cuneate: both surfaces quite glabrous; main-nerves 7 or 8 pairs, rather straight, ascending, thin but prominent on the lower surface; length 3·5 to 5 in.; breadth 1·5 to 2·5 in.; petiole ·25 to ·4 in., slightly winged near the apex: stipules oblong-obovate, blunt, ·5 in. long. *Peduncles* two or three together, erect, 1·5 to 2·5 in. long, dilated near the minutely bracteate apex. *Capitules* about 1 in. in diam. *Calyx*-tube short: its lobes long, partly deciduous; hirsute and sub-lanceolate in the lower persistent part, glabrous and clavate in the upper deciduous part. *Corolla* infundibuliform; the tube glabrous, ·25 in. long: its lobes minutely glandular, pubescent outside, broadly ovate, blunt. *Anthers* reaching to the top of the tube, linear-oblong, shortly apiculate, the base sub-cordate. *Capsules* cuneiform, ridged, the apex villous, crowned by the calyx-limb. Havil. in Journ. Linn. Soc. XXXIII. 60.

PERAK: *King's Collector* 10276.—DISTRIB. Borneo.

3. NAUCLEA PURPURASCENS, Korth. Verh. Nat. Gesch. 158. A small tree, the young branches brown when dry, purple when fresh. *Leaves* thinly coriaceous, elliptic, elliptic-oblong, oblanceolate or oblong-oblanceolate, acute or sub-acute, the base attenuate; both surfaces glabrous; main-nerves 7 to 9 pairs, rather straight, spreading, prominent on the lower surface, the midrib broad, length 4·5 to 8·5 in.; breadth 1·75 to 3 in.; petiole ·35 to ·75 in.; *stipules* ovate, acute, ·75 in. long. *Capitules* 1·5 to 1·75 in. in diam., the peduncles 1·5 to 3 in. long, solitary or in threes, with 2 large boat-shaped sub-persistent bracts at the apex embracing the capitule. *Calyx*-tube short; the lobes 5, erect, linear, blunt, adpressed hairy. *Corolla* infundibuliform, glabrous; the lobes 5, short, broad, blunt, puberulous outside. *Anthers* 5, linear with a minute apical appendage; filaments shorter than the anthers. *Fruit* ribbed; the apex depressed, densely villous, the remains of the calyx-lobes short, hairy. Havil. in Journ. Linn. Soc. XXXIII. 58. Koord. & Valet. Bijdr. 8, p. 24. *N. Blancoi*, Vidal Phan. Cum. Phil. 175. *N. purpurea*, Blume Bijdr. 1008 (not of Roxb.).

SELANGOR: *Ridley* 7446. PAHANG: *Ridley* 2189. PERAK: *Scortechini* 112; *Ridley* 9721; *King's Collector* 8603, 10276, 10641; *Wray* 195. ANDAMANS AND NICOBARS: *Kurz*; *Prain's Collector*.—DISTRIB. Java; Borneo; Celebes; Philippines.

The large bracts which envelope the capitules in their younger stages are very characteristic of this species. It is closely allied to *N. peduncularis*, G. Don, as noted under that species.

4. NAUCLEA NICOBARICA, Havil. in Journ. Linn. Soc. XXXIII. 59. A tree; young branches slender, compressed, pale, smooth. *Leaves* thickly membranous, elliptic or obovate-elliptic, shortly and bluntly acuminate, the base cuneate, both surfaces glabrous; main-nerves 5 to 7 pairs, spreading, slightly curved, prominent on the lower surface, midrib very stout; length 3.5 to 7 in.; breadth 2 to 3.5 in.; petiole .5 to .8 in.; stipules shorter than the petiole, obovate-oblong, blunt. *Peduncles* usually in threes, rarely solitary, slightly compressed and thickened towards the bracteate, striate, adpressed hairy apex. *Calyx* with a short cylindric tube: the mouth with 5 broadly oblong, blunt lobes, pubescent. *Corolla* glabrous, .35 in. long, infundibuliform; the lobes of the mouth 5, broadly oblong, blunt. *Anthers* 5, oblong, sagittate at the base, slightly apiculate at the apex, half exserted from the throat of the corolla; filaments more than half as long as the anthers. *Fruit* ridged, densely villous on the apex and covered by the white calyx-teeth. *N. purpurascens*, var. *latifolia*, Korth. (*vide* Haviland) Korth. ex Miq. Ann. Mus. Lugd. Bat. IV. 182.

NICOBAR ISLANDS: *Kurz.* ANDAMANS: *Prairie's Collector* 83.

5. NAUCLEA PEDUNCULARIS, G. Don Syst. III. 469. A tree 40 to 60 feet high; young branches pale purplish-brown when dry. *Leaves* coriaceous, elliptic or elliptic-obovate, sub-acute, the base cuneate or rounded; upper surface quite glabrous, shining, the lower dull, minutely scaly when dry; main-nerves 9 to 11 pairs, ascending, very slightly curved; length 5 to 9 in.; breadth 2.5 to 4 in.; petiole .4 to .6 in. *Capitules* globose-ovoid, 1.25 to 1.5 in. broad; the peduncles usually in threes, sometimes solitary, slightly compressed, thickened at the apex; bracts near the base (*vide* Haviland) small, ternate, deciduous. *Calyx*-tube short, silky, the lobes 5 or 6, erect, ovate, acute or sub-acute. *Corolla* infundibuliform, the tube glabrous; lobes 5, ovate, glabrous, rarely puberulous outside. *Stamens* 5, inserted in the tube of the corolla: *anthers* linear-oblong, sagittate at the base, the apex with a broad membranous apiculus; filaments as long as the anthers. *Style* exserted: *stigma* short, ovoid. *Fruit* cuneiform, boldly ribbed, its apex depressed and slightly hairy. *Bracteoles* of the capitule with filiform stalks and double fusiform heads; the upper part of the head papillose and yellow; the lower covered with pale hair. Wall. Cat. 6091; Hook. fil. Fl. Br. Ind. III. 27; Havil. in Journ. Linn. Soc. XXXIII. 57.

PENANG: *Porter*; *Curtis* 1056, 3405. PERAK: *Wray* 2598, 3197; *King's Collector* 3404, 3578, 6424, 6761.—DISTRIB. Borneo, *Beccari* (P.B. 1890).

Very close to *N. purpurascens*, Korth., but the nerves of the leaves of this are more numerous, the bracts of the peduncles are much smaller; the apical appendage of the anthers is much longer and the filaments shorter.

5. ADINA, Salisb.

Trees or shrubs with petiolate sub-coriaceous or membranous leaves; the stipules small or large. *Flowers* sessile, in small bracteolate capitules. *Peduncles* in large or small panicles, or solitary, terminal or axillary. *Calyces* not concrete; the tube angled: lobes of the limb 5, short, persistent, or none. *Corolla* infundibuliform: the throat glabrous: lobes of the limb 5, imbricate or pseudo-valvate, the flowers mixed in the capitules with bracteoles. *Stamens* 5, on the mouth of the corolla; anthers short, oblong; filaments short. *Ovary* 2-celled; style thin, filiform, elongate; *stigma* clavate or capitate. *Ovules* numerous, imbricate on a pendulous placenta in each cell. *Fruit* 2-coccos, many-seeded. *Seeds* oblong, flat; testa winged; albumen fleshy.—DISTRIB. Eight or nine species, tropical Asiatic or African.

Capitules in threes on axillary peduncles; stigma globose... 1. *A. rubescens*.
 Capitules in large lax usually terminal panicles; stigma
 clavate 2. *A. polycephala*.

1. ADINA RUBESCENS, Hemsl. in Journ. Bot. XXV. (1887), 204. A tree 60 to 80 feet high; young branches pale, striate, slender. *Leaves* sub-coriaceous, elliptic, shortly caudate-acuminate, the base cuneate; upper surface glabrous, the lower sometimes puberulous on the nerves, faintly reddish-brown in colour (when dry): main-nerves 8 to 10 pairs, spreading, curving, prominent below; length 2.5 to 4 in.; breadth 1.25 to 1.75 in.; petiole .15 to .25 in., slightly winged for half its length; *stipules* small bifid. *Capitules* about .4 in. in diam. when in flower, in short, pedunculate, trichotomous, pubescent panicles, much shorter than the leaves. *Calyx* pubescent; the lobes very short, oblong. *Corolla-tube* .1 in. long, hairy outside; its lobes 4 or 5, ovate, sub-valvate. *Stamens* inserted in the throat; *anthers* extending to the middle of the lobes, sub-setose at their bases. *Style* exerted; *stigma* globose. *Bracteoles* linear, compressed, pubescent. Havil. in Journ. Linn. Soc. XXXIII. 45.

PERAK: *Wray* 539; *King's Collector* 7850. SINGAPORE: *Ridley* 10458. PENANG: *Curtis* 369.

2. ADINA POLYCEPHALA, Benth. Fl. Hongkong 146. A small tree; the young branches sub-compressed, slender, striate, at first dark but becoming pale. *Leaves* sub-coriaceous, oblong-oblancheolate, shortly caudate-acuminate, the base alternate; both surfaces glabrous: main-nerves 7 to 10 pairs, curving upwards, slightly prominent beneath;

length 4·5 to 9 in.; breadth 1·5 to 3 in.; petiole ·2 to ·6 in., winged near the apex. *Capitules* about ·35 in. in diam. when in flower, in pedunculate, trichotomously-branched, lax or condensed axillary or terminal pubescent panicles, shorter than the leaves. *Lobes* of the *calyx* oblong, obtuse, persistent. Tube of *corolla* glabrous, narrow; ·1 in. long; lobes 4 or 5, ovate. *Anthers* reaching to the middle of the lobes of the corolla. *Style* exerted, stigma clavate. *Fruit* obovoid, hairy in its upper part: bracteoles filiform. *Seeds* very shortly winged. Miq. Ann. Mus. Lugd. Bat. IV. 183; Koord. & Valet. Bijdr. 8, 17. *Nauclea polycephala*, Wall. Cat. 6100; G. Don Gen. Syst. III. 467; Kurz For. Flora Burma II. 65.

VAR. *macrophylla* Hook. fil. Fl. Br. Ind. II. 25, leaves oblanceolate, with 10 to 12 pairs of main-nerves, 6 to 10 in. long and 2·5 to 4 in. broad. *N. microcephala*, Wall. MSS. in Herb. Hook. *Adina aralioides*, Benth. & Hook. Gen. Plant. II. 30. *Nauclea capitellata*, Voigt Hort. Calc. 375. *N. trichotoma*, Zoll. Verz. Ind. Archipel. 61. *N. aralioides*, Miq. Fl. Ind. Bat. II. 344. *Cephalanthus aralioides*, Zoll. l.c.

PENANG: *Curtis* 2737, 2751. MALACCA: *Ridley* 758; *Derry* 130.—
DISTRIB. Java; Sumatra; Cochin China; Burma; Chittagong.

The variety *macrophylla* is the form most frequent in our region.

6. UNCARIA, Schreb.

Climbing shrubs. *Leaves* shortly petioled; stipules entire or bifid. *Flowers* in peduncled globose heads, solitary and axillary or collected in terminal panicles; peduncles (often without flowers) converted into stout, recurved hooks. *Calyx-tube* cylindrical or double fusiform; the limb usually expanded, 5-toothed or 5-lobed. *Corolla* with a long cylindrical tube, often expanded towards the apex, the limb with 5 slightly imbricate or valvate lobes, the throat glabrous. *Stamens* 5, inserted by short filaments on the throat of the corolla; *anthers* dorsifixed, with 2 basal bristles. *Ovary* fusiform, 2-celled. *Style* long, slender; *stigma* capitate; ovules many, ascending on the placentas. *Capsule* elongate, usually double fusiform, septicidally 2-valved, many-seeded. *Seeds* minute, numerous, imbricating upwards; the nucleus small, its testa winged at each end; albumen fleshy, embryo clavate, cotyledons short.—DISTRIB.: about 40 species mostly tropical Asiatic.

Lobes of calyx narrow, acute:—

Flowers and capsules subsessile 1. *U. Roxburghiana*.

Flowers and capsules distinctly pedicellate:—

Leaves pubescent beneath:—

Calyx-lobes lanceolate, acute, shorter than the tube:—

Flowers ·75 in. long; leaves ovate-lanceolate, 2·5

to 3·5 in. long 2. *U. lanosa*,

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- Flowers 1·5 in. long; leaves broadly oblong or ovate-rotund, 5 to 7 in. long ... 3. *U. sclerophylla.*
- Flowers 1 in. long; leaves 4 or 5 in. long, oblong or ovate, never rotund-ovate ... 4. *U. pedicellata.*
- Calyx-lobes filiform, longer than the tube, spreading; tube of corolla very slender; capsules on long, slender stalks:—
- Young branches, under surfaces of leaves, and capsules rusty-pubescent ... 5. *U. ferrea.*
- Young branches and capsules glabrous; leaves slightly pubescent on the under surface only ... 6. *U. glabrata.*
- Leaves glabrous or nearly so on both surfaces:—
- Lobes of the calyx shorter than the tube ... 7. *U. Kunstleri.*
- Lobes of the calyx as long as the tube ... 8. *U. Wrayi.*
- Lobes of the calyx short, broad, blunt:—
- Leaves quite glabrous, not glaucescent beneath:—
- Leaves 1·75 to 2·5 in. long:—
- Leaves with 3 or 4 pairs of nerves; tube of calyx densely pubescent, the lobes of the limb sub-glabrous ... 9. *U. ovalifolia.*
- Leaves with 5 or 6 pairs of nerves; tube and lobes of calyx pubescent externally ... 10. *U. jasmniflora.*
- Leaves 3·5 in. or more in length:—
- Nerves of leaves 5 or 6 pairs ... 10. *U. jasmniflora*
var. *macrophylla.*
- Nerves of leaves 3 pairs ... 11. *U. trinervia.*
- Leaves glabrous, glaucescent beneath; nerves of leaves 7 or 8 pairs, the reticulations transverse and very distinct beneath ... 12. *U. pteropoda.*
- Leaves glabrous, but the 4 or 5 pairs of main-nerves with tufts of hair on the lower surface, at their union with the midrib ... 13. *U. Gambier.*
- Leaves uniformly caescent beneath: nerves 5 or 6 pairs ... 14. *U. canescens.*
- Under surfaces of midrib and the 4 to 6 pairs of main-nerves laxly hirsute, sometimes with tufts of hair in the nerve-axils ... 15. *U. dasyoneura.*
- Calyx-tube long, the teeth very short and blunt:—
- Nerves of leaves 6 to 8 pairs, stout, and bearing like the midrib and transverse veins short pale-brownish hairs ... 16. *U. attenuata.*

1. *UNCARIA ROXBURGHIANA*, Korth. in Ver. Nat. Gesch. Bot. 172.

Young branches obtusely 4-angled, densely clothed with minute, partially deciduous, harsh, rusty tomentum. Leaves coriaceous, ovate, acuminate sometimes caudately so; the base rounded, emarginate or minutely cordate; both surfaces reticulate, the upper strigose-scabrid, the lower with longer curved hispid hairs; main-nerves 4 or 5 pairs, curved, spreading, ascending, depressed on the upper and prominent on the lower surface like the midrib; length 2·5 to 3·5 in.; breadth 1·5 to

2 in.; petiole .15 in., tomentose; stipules broad, bifid, glabrous, .2 in. long. *Peduncles* five or six times longer than the petioles, axillary, stout, compressed, tomentose, bracteate near the apex, sometimes one of them barren and forming a much-recurved hook; heads in flower about 1 in. in diam., in fruit rather less. *Calyx* almost sessile, .15 in. long, pilose; the tube oblong-ovoid; lobes of its mouth linear, blunt, twice as long as the tube. *Corolla* about three times as long as the calyx, glabrous: the tube narrowly cylindrical, angled, the lobes of the limb broadly oblong, very obtuse. *Capsules* sub-sessile, narrowly double-fusiform, glabrous, .35 in. long, crowned by the short calyx-lobes. Hook. fil. Fl. Br. Ind. III. 32: Havil. in Journ. Linn. Soc. XXXIII. 87.

SINGAPORE: *Anderson* 106; *Ridley* 2844. PERAK: *King's Collector*. 2148. MALACCA: *Maingay* (K.D.) 831.—DISTRIB. Sumatra.

2. *UNCARIA LANOSA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 131: Wall. Cat. 6110. Young branches sparsely hirsute, reddish-brown when dry. *Leaves* membranous, ovate-lanceolate, shortly acuminate, the base rounded or narrowed: upper surface of a warm-brown when dry, glabrous or with scattered hairs, the midrib and nerves pubescent: lower surface pale brown, clothed with soft, adpressed long slender tawny hairs especially on the midrib and 6 or 7 pairs of rather bold slightly curved ascending main-nerves; length 2.5 to 3.5 in.; breadth 1 to 1.6 in.; petioles .15 to .2 in. long, pubescent; *stipules* broadly triangular, deeply bifid, reflexed, glabrous inside. *Peduncles* axillary, several times longer than the petioles, tapering upwards, somewhat compressed, pubescent, with 4 linear reflexed glabrous bracts near the apex. *Capitules* .75 in. in diam. when in flower, 2 in. when in fruit. *Calyx* .2 in. long, pedicellate, glabrescent, the tube double-fusiform, not longer than the 5 linear externally hairy lobes of the limb. *Corolla* glabrous, three times as long as the calyx; the tube very narrow, the lobes linear, spreading. *Capsules* clavate-fusiform; .25 to .35 in. long, on long slender pedicels, longer than themselves, glabrous. Hook. fil. Fl. Br. Ind. III. 33; Havil. in Linn. Journ. XXXIII. 85. *Nauclea lanosa*, Poir. Encycl. Suppl. IV. 64. *N. setigera*, Blume Bijdr. 1013.

PENANG: *Phillips*; *Curtis* 917. PERAK: *Scortechini*.

3. *UNCARIA SCLEROPHYLLA*, Hunter in Roxb. Hort. Beng. 86; Fl. Ind. ed. Wall. II. 130; idem ed. Carey I. 520. Very large; young branches as thick as or thinner than a goose-quill, densely rusty-pubescent or villous, 4-angled, sometimes bearing stout recurved hooks. *Leaves* coriaceous, broadly oblong or ovate or rotund-ovate; shortly and bluntly apiculate, the base rounded and sometimes minutely cordate: upper surface dark-coloured, shining, the nerves hairy; the lower densely rusty-pubescent; the midrib, 8 to 10 pairs of main-nerves and

the transverse veins much depressed on the upper, very prominent on the lower surface; length 5 to 6·5 in.; breadth 3 to 5 in.; petiole ·4 to ·6 in.; stipules large, rounded, bluntly bifid, sparsely hairy, reflexed, ·5 in. long. *Heads* from 4 to 5·5 in. in diam. to the ends of the style, on thick, axillary, rusty-pubescent spreading peduncles shorter than the leaves, bearing a whorl of bracts about the middle. *Calyx* pedicellate about ·5 to ·8 in. long, densely adpressed-sericeous, the tube short, ovoid; the limb campanulate, cut into 5 narrowly lanceolate, acute lobes. *Corolla* villous or sericeous externally; about twice as long as the calyx; its tube narrow, cylindrical below; the mouth funnel-shaped and deeply cut into 5 oblong or lanceolate sub-acute, erect lobes. *Capsules* on slender, rusty stalks; ·5 to 1 in. long, oblong, tapering much to each end; densely but shortly rusty-pubescent, ribbed, ·6 or ·7 in. long, crowned by the large funnel-shaped calyx-limb. *U. sclerophylla*, DC. Prod. IV. 347; Miq. Fl. Ind. Bat. II. 148; Hook. fl. Fl. Brit. Ind. III. 28; Koord. & Valet. Bijdr. 8, 42. *U. speciosa*, Wall. Cat. 6106. *U. insignis*, DC. Prod. IV. 348; Havil. l.c. 78; *U. Ralli*, Korth. Verh. Nat. Gesch. Bot. 165, t. 33. *Nauclea rotundifolia*, DC. Prod. IV. 346. *Nauclea sclerophylla*, Hunter in Trans. Linn. Soc. IX. 223.

In all the provinces except the Andamans, more or less common.—
DISTRIB. Malay Archipelago.

This is closely allied to *U. pedicellata*, Roxb., which see.

4. *UNCARIA PEDICELLATA*, Roxb. Hort. Beng. 86: Fl. Ind. ed. Carey I. 520; idem, ed. Wall. II. 128. Like *U. sclerophylla*, Roxb. in all its parts, but somewhat less robust and much less hairy, the leaves smaller, narrower, never subrotund, paler and much less hairy beneath; sometimes even sub-glabrous; the flowers smaller (only about 1 in. long); the lobes of the calyx only ·25 in. long; the tube of the corolla only ·4 or ·5 in. long, more slender, ferruginous-silky, rather than pilose or villous; capsule shorter (·5 to ·6 in.) but wider in proportion. DC. Prod. IV. 348; Korth. Verh. Nat. Gesch. 166; Miq. Fl. Ind. Bat. II. 142; Hook. fl. Fl. Brit. Ind. II. 28; Havil. in Journ. Linn. Soc. XXXIII. 77 (in part); Koord. & Valet. Bijdr. 8, 43. *U. sclerophylla*, Deless. Ic. Pl., t. 81; Havil. l.c. (in part). *U. ferruginea*, DC. Prod. IV. 348; Korth. Verh. Nat. Gesch. 166; Kurz. Fl. Burn. II. 69. *U. sclerophylla* Havil. (not of Roxb.) in Journ. Linn. Soc. XXXIII. 78. *Uncaria pedicellata*, Bl. Bijdr. 1012. *Nauclea ferruginea*, Bl. Bijdr. 1013.

In all the Provinces, very common.

This closely resembles *U. sclerophylla*, Roxb., and should probably be treated as a variety of that species. In a few specimens of this the under surfaces of the leaves between the reticulations are pale-grey and pitted.

5. *UNCARIA FERREA*, DC. Prod. IV. 348. Young branches much thinner than a goose-quill, minutely but deciduously rusty-pubescent, the bark dark-coloured. *Leaves* membranous, ovate or ovate-lanceolate, shortly and bluntly acuminate, the base rounded or slightly emarginate; upper surface dark-coloured when dry, glabrous or with a few scattered deciduous sub-adpressed pale hairs, the midrib and sometimes the main-nerves pubescent; lower surface pale, minutely reticulate, sub-adpressed rusty-pilose on the midrib and nerves; main-nerves 7 or 8 pairs, curving upwards, depressed on the upper surface like the midrib and prominent on the lower; length 2·5 to 3·25 in.; breadth 1·35 to 2 in.; petioles ·1 to ·2 in., tomentose; stipules broadly semilunar, deeply two-lobed, adpressed rusty-pilose, ·25 in. long. *Peduncles* much longer than the petioles, but shorter than the leaves, lengthening in fruit, compressed, densely ferruginous-tomentose; bracteate above the middle; heads about 1·5 to 2 in. in diam. when in flower, and 2 to 3 in. when in fruit. *Calyx* shortly stalked, ·25 in. long, silky; the tube narrowly oblong-ovoid; the limb deeply divided into filiform lobes longer than the tube. *Corolla* about twice as long as the calyx, glabrous; its tube very narrowly cylindric, angled: the lobes of the mouth broadly oblong or obovoid, very obtuse. *Capsules* double-fusiform, ridged, pubescent, ·5 to ·75 in. long, crowned by the filiform calyx-lobes, tapered into slender pedicels as long as themselves. Hook. fil. Fl. Br. Ind. III. 33; Havil. in Journ. Linn. Soc. XXXIII. 87; Koord. & Valet. 8, 44. *U. Horsfieldiana*, Miq. Fl. Ind. Bat. II. 151. *Nauclea ferrea*, Blume Bijdr. 1014.

PERAK: *Scortechini* 130; *Wray* 2555; *Curtis* 1305; *King's Collector* 2240, 2453, 4899. SELANGOR: *Goodenough*.—DISTRIB. Sumatra; Borneo; Java.

VAR. *tomentosa*; young branches, under-surfaces of leaves and peduncles densely rusty-tomentose, calyx and capsules more silky than in the type.

MALACCA: *Maingay* (K.D.) 830; *Derry* 1070; *Ridley* 10078. PERAK: *King's Collector* 429, 790, 5390. PAHANG: *Ridley* 2192. NEGRI SEMBILAN: *Ridley* 10080. ANDAMANS: *Helper* 2761.—DISTRIB. Java; Sumatra.

6. *UNCARIA GLABRATA*, DC. Prod. IV. 348. As in *U. ferrea* but with young branches glabrous and often bearing shining, much recurved slender hooks about than ·5 in. long; longer peduncles (which are glabrous and bracteate not much below the apex); less filiform, blunt calyx lobes; and glabrous capsules which are thicker but shorter (about ·4 in. long). Havil. in Journ. Linn. Soc. XXXIII. 85; Koord. & Valet. Bijdr. 8, 44. *U. Lobbii*, Hook. fil. in Fl. Br. Ind. III. 33.

SINGAPORE: *Lobb*. 100, 332; *Ridley* 2846, 2853, 8035; *Hullett*; *King's Collector* 277. SELANGOR: *Goodenough*.—DISTRIB. Sumatra; Java; Borneo.

7. *UNCARIA KUNSTLERI*, King n. sp. Young branches thinner than a goose-quill, 4-angled, grooved, deciduously puberulous. *Leaves* coriaceous, elliptic or obovate-elliptic, narrowed to the petiole, the apex with a small blunt acumen; both surfaces sparsely and minutely puberulous especially on the midrib and 5 or 6 pairs of ascending slightly curved main-nerves; main-nerves depressed on the upper surface, thin but prominent on the lower; length 2.5 to 4 in.; breadth 1.25 to 2.25 in.; petiole .35 to .5 in., puberulous; stipules .3 in. long. *Peduncles* as long as or slightly longer than the petioles, axillary, compressed in the lower half, often hooked, bracteate about the middle; *heads* nearly 1 in. in diam. when in flower. *Calyx* .1 in. long, its stalk .05 in., densely pubescent, the tube narrowly funnel-shaped, the lobes of the mouth narrowly oblong, acute, shorter than the tube. *Corolla* three times as long as the calyx, adpressed-pilose, very narrowly cylindrical, funnel-shaped in its upper third, the lobes of the limb oblong, blunt.

PERAK: *King's Collector* 5376, 6843.

Very near *U. jasminiflora*, but with more coriaceous leaves, and narrower, more oblong calyx-lobes.

8. *UNCARIA WRAYI*, King n. sp. A bush (?). Young branches half as thick as a goose-quill, dark-coloured, with small pale white lenticels, obtusely 4-angled, glabrous. *Leaves* coriaceous, broadly obovate-elliptic, shortly and bluntly acuminate, narrowed at the base; both surfaces glabrous, the upper shining olivaceous when dry: the lower paler and minutely reticulate (the veinlets very dark); main-nerves 5 pairs, slightly curved, ascending, inconspicuous; length 2.5 to 3 in.; breadth 1.35 to 1.9 in.; petioles .5 in., slender. *Peduncles* axillary, slightly longer than the petioles, compressed; bracteate above the middle; glabrous below the bract and pubescent above it. *Calyx* shortly pedicelled, densely pubescent, .2 in. long; the tube cylindric or somewhat double fusiform, about as long as the narrowly campanulate limb; lobes lanceolate, sub-acute. *Corolla* softly pubescent, known only in bud.

PERAK: *Wray* 2383.

9. *UNCARIA OVALIFOLIA*, Roxb. Hort. Beng. 86; Fl. Ind. I. 519; in Wall. Cat. sub. 6103 B, C, (*U. Gambier*). Young branches thinner than a crow-quill, obtusely 4-angled, glabrous. *Leaves* membranous, elliptic to ovate-elliptic, the apex shortly and obtusely acuminate or sub-acute, the base cuneate; both surfaces glabrous; main-nerves 3 or 4 pairs, ascending, slightly curved, thin; length 1.75 to 2.75 in.; breadth .85 to 1.4 in.; petiole .35 to .45 in., slender, stipules broad, lunate-acute, bifid, .35 in. long. *Peduncles* axillary, about twice as long as the

petioles, slender, rusty-puberulous, or glabrous, occasionally forming compressed tapering much recurved hooks, the bract small and near the base. *Head* about 1 in. in diam. in flower and 1.5 in. in fruit. *Calyx* .15 in. long, nearly sessile, densely rusty-pubescent except the lobes; the tube narrowly ovoid, contracted into a cylindric deeply lobed limb, the lobes short, broadly oblong, blunt, spreading, sub-glabrous. *Corolla* twice as long as the calyx, very narrowly funnel-shaped, pale pubescent outside, the teeth narrowly oblong, blunt, glabrous inside. *Capsules* narrowly double-fusiform, occasionally somewhat curved, about .4 or .5 in. long, crowned by the thick, erect calyx-tube, narrowed into the short rusty pilose pedicel, adpressed-pubescent. Hook. fil. Fl. Br. Ind. III. 30. *N. ovalifolia*, Spreng. Syst. IV. Curae Post. 80.

MALACCA: *Griffith* (K.D.) 2758, 2759; *Cunning* 2292. SELANGOR: *Curtis* 2342. PERAK: *Scortechini*; *King's Collector* 5262.—DISTRIB. Burma; Borneo.

10. UNCARIA JASMINIFLORA, Hook. fil. Fl. Br. Ind. III. 32. Young branches thinner than a goose-quill, somewhat compressed, 4-angled, puberulous. *Leaves* thinly coriaceous, broadly elliptic, rarely elliptic-lanceolate, with an abrupt, short, blunt acumen, the base rather abruptly narrowed to the slender petiole; both surfaces glabrous; when adult the nerves and midrib on the lower surfaces puberulous; when young the upper pale brown and shining when dry; the lower paler and minutely reticulate; main-nerves 5 or 6 pairs, spreading, curving upwards, thin; length 2 to 2.5 in.; breadth 1 to 1.5 in.; petiole .5 in., puberulous; stipules entire, .2 in. long. *Peduncles* axillary, longer and thicker than the petioles; compressed, puberulous; heads rather more than 1 inch in diam. when in flower, about 1.75 when in fruit, bracteate near the apex. *Calyx* shortly pedicellate, .15 in. long, adpressed pilose; the tube shortly double-fusiform, about as long as the campanulate limb, lobes short, broad, obtuse, glabrous inside. *Capsules* about .5 in. long, double-fusiform, crowned by the calyx-limb, ridged, puberulous, their pedicels slender, .15 to .2 in. long. Wall. Cat. 6103 C.F.; Havil. in Journ. Linn. Soc. XXXIII. 80.

MALACCA: *Griffith* (K.D.) 2766; *Maingay* (K.D.) 832, 833. SINGAPORE: *Ridley* 10415, 6467; *King* 382. PERAK: *King's Collector* 4619, 7860; *Wray* 3124. SELANGOR: *Ridley* 8579.—DISTRIB. Borneo.

VAR. *macrophylla*, King. Stem-hooks stout, compressed, much curved. *Leaves* 3.5 to 5 in. long, dark brown and very shining in the upper surface, 3.5 to 5 in. long and 2 to 2.5 in. broad; capsules nearly glabrous.

SINGAPORE: *Schomburgk* 65; *Anderson* 87; *Hullett* 41, 75.

11. UNCARIA TRINERVIS, Haviland in Journ. Linn. Soc. XXXIII.

80. Young branches thinner than a goose-quill, obtusely 4-angled, compressed and broad at the nodes, pale brown, glabrous; the hooks much curved and compressed. *Leaves* coriaceous, pale brown when dry, ovate or elliptic, slightly and abruptly narrowed at the base, the apex shortly, abruptly and broadly acuminate; both surfaces quite glabrous, with fine transverse veins and minute reticulations; main-nerves 3 pairs, ascending, depressed on the upper, but prominent on the lower surface; length 3·5 to 4·5 in.; breadth 1·75 to 2·5 in.; petiole ·7 to ·9 in.; stipules small, broad, entire. *Inflorescence* racemose; peduncles ·75 in. long, compressed, minutely pubescent; their bases broad and glabrous; bracts (*vide* Haviland) entire, ·15 in. long. *Heads* (including the styles) about 1 in. in diam., the flowers sub-sessile, pale tomentose externally. *Calyx* ·1 in. long, its lobes broad, blunt. *Corolla* ·25 in. long, the tube cylindrical; the lobes broad, blunt. *Capsules* double-fusiform, crowned by the conspicuous calyx, minutely pilose, ·5 in. long; *receptacles* without bracteoles, hirsute.

PENANG: *Curtis* 1247. PERAK: *Curtis* 2981.

Allied to *U. pteropoda*, Miq., but with smaller quite glabrous leaves which have only 3 pairs of nerves and with smaller flowers. Allied also to *U. canescens*, Korth., from which it is distinguished by its smaller, fewer-nerved, glabrous leaves.

12. UNCARIA PTEROPODA, Miq. Fl. Ind. Bat. II. 343. Young branches 4-angled, somewhat compressed, broadly grooved, as thick as a goose-quill, glabrous. *Leaves* coriaceous, elliptic-rotund, the apex with a short, broad, blunt point, the base broad and rounded; both surfaces glabrous, the upper shining, minutely reticulate (when dry): the lower pale-glaucous; main-nerves about 8 pairs, deeply depressed like the midrib on the upper surface, prominent on the lower, spreading, curving slightly upwards; length 5 to 6·5 in.; breadth 3·5 to 5 in.; petiole ·35 to ·85 in. long, with a broad undulate wing. *Peduncles* axillary, strong, much compressed, grooved, somewhat longer than the petioles, often much recurved, bracteate near the apex; sometimes collected into a terminal panicle longer than the leaves; *heads* about 1 inch across when in flower, two or three times as much when in fruit. *Calyx* shortly stalked, ·25 to ·3 in. long in flower, rusty-pubescent; its tube narrow, double-fusiform, about ·25 in. long, crowned by the short narrowly campanulate limb, its lobes narrowly oblong, blunt or sub-acute. *Corolla* nearly three times as long as the calyx, silky, the tube narrowly cylindrical; the lobes of the limb broad, obovate, blunt. *Capsules* narrowly double-fusiform, ·6 to ·75 in. long, up to 1 in. when quite ripe; on stalks nearly as long, minutely rusty-pubescent, crowned by the short calyx-tube. Hook. fil. Fl. Br. Ind. III. 29; Havil. in Journ. Linn. Soc. XXXIII. 82.

SINGAPORE: *Ridley* 2854; *Anderson* 105. PERAK: *Wray* 2738, 3115
Scortechini 256; *King's Collector* 2528, 4587, 6576, 7831, 7882, 10189,
 10593. PENANG: *Phillips*; *Curtis* 332. MALACCA: *Maingay* (K.D.) 829.
 —DISTRIB. Sumatra; Borneo.

A very distinct species, the leaves drying of a pale colour.

13. *UNCARIA GAMBIEI*, Hort. Beng. 86; Fl. Ind. I. 517. Young branches thinner than a goose-quill, obtusely 4-angled, glabrous. *Leaves* thinly coriaceous, olivaceous; brown when dry, the lower surface paler; ovate or oblong-ovate, shortly acuminate, the base usually rounded, occasionally a little narrowed and oblique; both surfaces glabrous except for the tufts of hair at the origin of the main-nerves from the midrib on the lower: main-nerves 4-5 pairs, curved, spreading, obscure on the upper, bold on the lower surface (when dry); length 3 to 4.5 in.; breadth 1.85 to 2.25 in.; petioles .2 to .25 in.; *stipules* ovate, bluntly acuminate, .3 in. long. *Peduncles* axillary, usually shorter than the leaves, slightly compressed, bracteate above the middle, glabrous below and pubescent above the bract; *heads* 1.75 in. in diam. when in flower, 2.75 in. in fruit. *Calyx* shortly stalked, .35 in. long, densely adpressed-silky; the tube cylindric, ridged; the mouth campanulate, somewhat shorter than the tube; its lobes spreading, ovate, blunt, glabrous inside. *Corolla* .5 in. long, narrowly funnel-shaped, with sparse (rarely dense) white hairs outside, the lobes broadly oblong, blunt, densely silky outside, glabrous inside. *Capsules* narrowly double-fusiform, sometimes curved, .75 to 1 in. long, crowned by the large calyx-tube, ridged, sparsely pubescent; the pedicels unequal, .2 to .4 in. long. Korth. Verh. Nat. Gesch. Bot. t. 34: Hook. fil. Fl. Br. Ind. III. 31: Havil. in Journ. Linn. Soc. XXXIII. 81; Wall. Cat. 6103 A.E.C. (in part) and 6107 in part. *Nauclea Gambier*, Hunter in Linn. Trans. IX. 218 t. 22; Flem. in As. Res. XI. 187. *U. acida*, Roxb. Fl. Ind. I. 520. *Nauclea acida*, Hunter in Linn. Trans. IX. 223.

SINGAPORE: *Cunning* 2403; *Anderson* 95; *Ridley* 2843; *Walker* 90; *King's Collector* 1158; *Hullett* 361. PERAK: *King's Collector* 2262. JOHOR: *King* 671. MALACCA: *Derry* 59; *Griff.* 2757.—DISTRIB. Over the whole Malayan Archipelago either cultivated or wild.

Maingay No. 827 differs from the sheets above noted in having brown leaves and rusty-pubescence. This may be the species named *U. acida* by Roxburgh whose description makes it impossible now to distinguish it from *U. Gambier*.

14. *UNCARIA CANESCENS*, Korth. Verh. Nat. Gesch. 172. A slender creeper; young branches thicker than a crow-quill; grooved, compressed and obtusely 4-angled, minutely pubescent. *Leaves* coriaceous,
 J. II. 20

olivaceous and shining on the upper surface, pale and dull on the lower (when dry), elliptic or ovate-elliptic, abruptly, bluntly and shortly acuminate, rounded or slightly narrowed at the base; upper surface glabrous except the puberulous midrib and nerves, the lower minutely pale-puberulous; main-nerves 5 or 6 pairs, depressed on the upper and prominent on the lower surface, slightly curved, ascending; length 3·5 to 5 in.; breadth 1·85 to 3 in.; petioles ·5 to ·7 in., pubescent. *Peduncles* slender, slightly longer than the petioles, densely rusty-pubescent in the upper parts bracteate about or below the middle; heads ·5 or ·6 in. in diam. *Calyx* ·15 in. long, shortly stalked, adpressed rusty-pilose, the tube double-fusiform, the mouth expanded, its lobes broad, blunt, glabrous within. *Corolla* rather more than twice as long as the calyx, pilose, the tube very narrowly cylindrical; the lobes of the mouth short, lanceolate-ovate, sub-acute, glabrous inside. *Capsules* unknown. Hook. fil. Fl. Br. Ind. III. 29; Havil. in Journ. Linn. Soc. XXXIII. 80.

PERAK: *King's Collector* 3871, 4584. PENANG: *Griffith, Curtis* 331.

15. *UNCARIA DASYONEURA*, Korth. Ver. Nat. Gesch. 169. Young branches obtusely 4-angled, glabrous. *Leaves* elliptic or elliptic-rotund, shortly, abruptly and bluntly acuminate, the base rounded or narrowed, upper surface dark-brown when dry, glabrous, shining; the lower paler brown; laxly hirsute on the midrib and nerves, otherwise glabrous, rarely with tufts of hair in the nerve axils; main-nerves 4-6 pairs, very slightly curved, ascending, distinct below; the intermediate veins horizontal: length 3 to 4 in.; breadth 1·75 to 2·25 in.; petioles about ·5 in. long, narrowly winged above, glabrous; *stipules* minute; entire. *Peduncles* shorter than the petioles, broad, glabrous and compressed at the base, thin and pubescent in the upper two-thirds, with deciduous, linear-oblong bracts at the point of constriction. *Flowers* sub-sessile. *Calyx* narrowly urceolate, minutely ferruginous-tomentose, about ·15 in. long; its limb with broad, blunt lobes. *Corolla* three times as long as the calyx: the tube narrowly cylindrical, adpressed hairy, the limb shortly campanulate, with 5 blunt lobes, glabrous inside. *Capsules* narrowly double-fusiform, glabrous, ·8 in. long, their pedicels shorter. Miq. Fl. Ind. Bat. II. 143; Hook. fil. Fl. Br. Ind. III. 31; Havil. in Linn. Journ. XXXII. 82. *U. Gambier*, Thw. Enum. Pl. Zeyl. 138. *U. elliptica*, R. Br. in Wall. Cat. 6104 A. (in part), B.

MALACCA: *Griffith* 2756; *Maingay* (K.D.) 827/2. SINGAPORE: *Lobb*. PENANG: *Phillips*; *Curtis* 1070. PERAK: *King's Collector* 2501.—DISTRIB. Java, Ceylon.

16. *UNCARIA ATTENUATA*, Korth. in Verh. Nat. Gesch. Bot. 170; t. 34. Young branches thinner than a goose-quill, obtusely 4-angled, minutely rusty-pubescent. *Leaves* coriaceous, broadly elliptic or ovate-

elliptic, slightly narrowed at base, the apex with a very short, blunt acumen; upper surface dark olivaceous-brown, shining; lower warm brown, with short pale brownish hairs on the midrib, nerves, and their axils, and on the distant transverse veins: main-nerves 6 to 8 pairs, boldly prominent on the lower, depressed on the upper surface; rather straight, ascending; length 3 to 5 in.; breadth 1.75 to 3 in.; petiole .4 to .5 in. *Peduncles* solitary, axillary, about twice as long as the petioles, much compressed in the lower half, rusty-pubescent. *Heads* (to the ends of the styles) nearly 1.5 in. in diam. *Flowers* shortly pedicellate. *Calyx* .15 in. long, funnel-shaped, rusty-tomentose; the tube slightly inflated, the limb as long as the tube with short blunt teeth. *Corolla* twice as long as the calyx, narrowly cylindric, the mouth abruptly expanded and cut into 5 deep, broad, blunt, oblong lobes. *Capsules* narrowly double-fusiform, crowned by the wide calyx-limb, .7 to .9 in. long, rusty-tomentose. *U. Gambier*, Wall. Cat. 6105 C. *in part.* Hook. fil. Fl. Br. Ind. I. 29; Havil. in Journ. Linn. Soc. XXXIII, 83. ? *U. sclerophylla*, Deless. Ic. Select. III. t. 81.

MALACCA: *Holmberg* 889. PENANG: *Hunter, Phillips, Curtis* 135. PERAK: *King's Collector* 4880; *Wray* 3150. TENASSERIM and ANDAMANS: *Helper* (K.D.) 2767.—DISTRIB. Borneo; ? Java.

DOUBTFUL SPECIES.

UNCARIA OVATA, R. Br. in Wall. Cat. 6112: Hook. fil. Fl. Br. Ind. III. 29. The single sheet bearing the No. 6112 in the Wallichian Herbarium at Burlington House has two things glued down on it, *viz.*, two twigs of *U. Gambier*, Roxb., and a third twig which must, by exclusion, be this. Unfortunately a specimen exactly resembling this third twig, collected by Finlayson and probably, like so many of his plants, in Siam, was issued by Wallich under the number 6103 D. and the name *U. Gambier*, while another also exactly like it, but collected in Sylhet, was issued by him under the number 6107 and the name *U. sessilifolia*. I have seen no Malayan specimens which resemble these two except the one attributed by Wallich to Singapur, which I, therefore, believe must have been so attributed as the result of some confusion of specimens at the time of issue.

7. COPTOSAPelta, Korth.

Scandent shrubs with terete branches. *Leaves* coriaceous, softly hairy beneath; stipules small, triangular, deciduous. *Flowers* in terminal many-flowered often thyrsoid panicles; the buds 5-angled; the pedicels short, bi-bracteolate. *Calyx-tube* ovoid, 5-ridged, the limbs shortly 5-toothed, persistent. *Corolla* coriaceous, salver-shaped; the tube narrow, its throat naked or hairy; the limb deeply divided into 5 linear-oblong, blunt, valvate lobes, longer than or as long as the tube. *Stamens* 5, inserted on the throat; anthers long, linear, flexuose, bifid at

the base, hairy on the back; filaments short, subulate. *Ovary* 2- to 3-celled, with many ascending ovules, the placentas on the septum. *Style* short; stigma exserted, long-fusiform, or quadrangular. *Capsule* 2-3-celled, sub-globose, loculicidally dehiscent by 2 or 3 valves. *Seeds* small, numerous, peltate, imbricate, winged; embryo straight, in fleshy albumen.—DISTRIB. Species all Malayan.

- Corolla-tube nearly as long as the lobes, its throat glabrous;
 calyx-tube under .05 in. in diam. 1. *C. flavescens*.
 Corolla-tube much shorter than the lobes, its throat densely
 woolly; calyx-tube more than .15 in. diam. 2. *C. Griffithii*.

1. *COPTOSAPELTA FLAVESCENS*, Korth. in Ned. Kruidk. Arch. II. 113. Young branches, panicles and under surfaces of the leaves covered with soft, minute, partly deciduous hair. *Leaves* elliptic or ovate, minutely apiculate, the base rounded, somewhat narrowed; upper surface glabrous and shining; main-nerves 4 or 5 pairs, curving upwards, slightly prominent on the lower surface; length 2.5 to 4 in.; breadth 1.5 to 2.5 in.; petiole .2 to .3 in., pubescent. *Stipules* very acuminate, .15 in. long. *Flowers* about 1 in. long (of which the calyx forms only .15 in.) *Calyx* under .05 in. in diam., tubular, 5-ridged, pilose; the 5 teeth small, erect, sub-glabrous. *Corolla-tube* .3 in. long, narrow; the lobes of the limb oblong, blunt, .4 in. long, reflexed, glabrous or sub-glabrous. *Anthers* and stigma nearly as long as the corolla-lobes. *Stigma* cylindrical-fusiform, puberulous. *Capsule* broadly obovoid, glabrous, .3 or .4 in. in diam. Hook. fil. Fl. Br. Ind. III. 35. *Stylocoryne macrophylla*, Wall. Cat. 8405 (excl. syn.) *Webera macrophylla*, Roxb.

PENANG: *Porter*, *Griffith* (K.D.) 2788. MALACCA: *Maingay* (K.D.) 908. PERAK: *Wray* 1801, 2521, 4276; *King's Collector* 4651, 7938, 10384, 10393, 10853. PAHANG: *Ridley* 2192.—DISTRIB. Burma; Malay Archipelago.

2. *COPTOSAPELTA GRIFFITHII*, Hook. fil. Hook. Ic. Plant. t. 1089: Fl. Br. Ind. III. 35. *Leaves* as in *C. flavescens*; but with only 3 pairs of nerves and the under surface paler and rather more hairy; also the panicles with fewer flowers. *Flowers* only .85 in. long, their buds nearly .15 in. in diam. *Calyx* rather more than .2 in. long and .15 in. in diam., the tube densely tomentose: the limb scantily hairy, cylindrical, nearly as long as the tube; its 5 or 6 teeth short, broad, erect. *Corolla-tube* .25 in. long and half as much wide, the throat densely woolly, the lobes of the limb linear-oblong, obtuse, reflexed, twice as long as the tube, rusty adpressed-pubescent on the lower, glabrous or sub-glabrous on the upper surface.

MALACCA and SINGAPORE: *Griffith* (K.D.) 2789; *Maingay* (K.D.) 907. PERAK: *Scortechini* 1983; *Wray* 1827; *King's Collector* 4366, 7938.

SINGAPORE: *King's Collector* 75. *Anderson* 101; *Ridley* 6824, 6891.
PAHANG: *Ridley* 2229.

8. MUSSAENDOPSIS, Baillon.

A tall tree, all parts glabrous except the inflorescence. *Leaves* very coriaceous, broad, entire, petiolate, main-nerves few, stout, veins indistinct; stipules coriaceous, oblong, blunt. *Flowers* shortly pedicellate in lax, axillary, cymose panicles, with opposite spreading branches. *Calyx* puberulous, campanulate; the limb truncate, with 5 minute, broad lobes, one of them occasionally developed into a large coloured obovate 5-nerved lobe attenuate at base, 1 in. long. *Corolla* short, puberulous outside, ovoid in bud: the tube very short or none, the lobes 5, thick, oblong, slightly twisted in bud, slightly papillose near the margin. *Disc* fleshy. *Stamens* 5; anthers linear-oblong, curved. *Style* fleshy, short, lobes of the stigma short, thick, rounded. Ovary 2-celled, the placentas attached to the septum. Ovules numerous. *Fruit* capsular, many-seeded, septicidal. *Seeds* small, winged at the margin; embryo fleshy with scanty albumen. A single species, Malayan.

MUSSAENDOPSIS BECCARIANA, Baillon in *Adansonia*, XII. 282. A tree 100 feet high. *Leaves* sub-orbicular to elliptic, shortly apiculate, 4 to 6 in. long and 2.75 to 4.5 in. broad: main-nerves about 6 pairs, rather straight, depressed on the upper and prominent on the lower surface: petiole .75 to 1 in. long: stipules oblong, blunt, almost as long as the petiole. *Panicles* about 8 in. in diam., and half as much long; their peduncles 3 to 4 in. long. *Calyx* .15 in. long: the foliaceous lobe obovate, tapering to the base, 1 to 1.25 in. long and .6 to .8 in. broad, white. *Corolla* lobes about .15 in. long and .1 in. broad, spreading or reflexed. *Capsule* oblong-subclavate, slightly compressed, .6 in. long; puberulous, very coriaceous, splitting from above downwards, the septum also coriaceous. *Stapf* in *Hook. Ic. Pl.* 2388. *Creaghia fagraeopsis*, *Scortechini* in *Journ. Bot.* 1884, 370.

MALACCA: *Maingay* (K.D.) 835, 1692; *Derry* 1044. PERAK: *Scortechini*, *King's Collector* 6195.—DISTRIB. Borneo, *Beccari*, *Haviland*; Sumatra, *Ridley* 9016.

9. GREENIA, W. & A.

Shrubs with terete branches. *Leaves* sometimes in whorls of three, membranous; stipules various. *Flowers* small, sessile, in terminal, paniced, scorpioid cymes, with or without bracteoles. *Calyx-tube* turbinate with 4 or 5 short, erect, persistent, subulate or ovate lobes, one longer than the others. *Corolla* funnel-shaped, pointed in bud, pubescent outside: the tube long almost glabrous inside; the limb with 4 or 5 erect ovate lobes, valvate in bud, but twisted. *Stamens* 4 or 5, inserted

by short filaments on the mouth of the corolla; anthers bifid at base and apex, slightly exserted. *Ovary* 2- (rarely 3-) celled; ovules numerous on peltate placentas attached to the septum: *style* filiform; stigmas 2-, exserted, linear, revolute. *Capsule* small, globose, crustaceous, 2-celled, dehiscing septicidally by 2 valves. *Seeds* falcate or rather square, somewhat compressed; the testa reticulate and sub-acute; embryo small, clavate, in fleshy albumen.—**DISTRIB.** Species 5 or 6, Malayan and Burmese.

GREENIA JACKII, W. & A. Prod. 404. An evergreen shrub. *Leaves* oblanceolate, minutely acuminate, gradually narrowed from above the middle to the short petiole, drying brown: upper surface with the midrib minutely pubescent; otherwise sparsely adpressed-puberulous, or quite glabrous; lower surface softly tawny-pubescent, especially on the midrib and 20 to 30 pairs of slightly curved, spreading main-nerves, or subglabrous; length 6 to 12 in.; breadth 2 to 3.5 in.; petioles .4 to 1 in., pubescent. *Stipules* broad, abruptly acuminate, .4 in. long, or broadly lanceolate and about .6 in. long. *Panicles* terminal, branched, shorter than the leaves, on long, compressed, pubescent peduncles, the lower branches nearly as long. *Flowers* numerous, secund, sessile, .3 to .35 in. long; the corolla several times longer than the calyx. *Capsule* globose, less than .1 in. in diam. crowned by the spreading calyx-lobes; the epicarp adpressed, pubescent, peeling off and showing the glabrous endocarp. Hook. fil. Fl. Br. Ind. III. 41. *Rondeletia corymbosa*, Jack in Mal. Misc. I. 4; *R. spicata*, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 139. *Wendlandia? corymbosa*, Wall. Cat. 6276; DC. Prod. IV. 413; Kurz For. Fl. Burma. II, 75; *W. ? spicata*, DC. l.c. 412.

In all the Provinces.

Rather variable as regards pubescence and the shape of the stipules: differs from the closely allied *G. Wightiana*, W. & A., chiefly in its leaves, having twice as many nerves as that species.

10. DENTELLA, Forst.

A small prostrate much-branched herb with 4-angled stems thinner than a crow-quill, rooting at the nodes, 4 to 12 inches long. *Leaves* small, shortly petioled; the stipules short, scarious. *Flowers* small, solitary in the axils of the leaves and forks of the branches, sessile or shortly pedicelled. *Calyx-tube* sub-globose; the limb membranaceous, tubular, toothed, persistent. *Corolla* white, funnel-shaped; the tube hairy inside: the limb with five 2- or 3-toothed lobes, valvate in the bud, but with the edges induplicate. *Stamens* 5, attached in the middle of the corolla-tube; *anthers* included, dorsifixed, linear, entire at base and apex; filaments short. *Ovary* 2-celled, with numerous ovules or hemispheric

placentas. *Style* short; stigmas 2, filiform, papillose. *Fruit* rather large for the size of the plant, dry, globose, 2-celled, indehiscent, with many minute, angled, dotted seeds.—**DISTRIB.** A single species inhabiting Asia, tropical Australia, and the islands of the Pacific.

DENTECLA REPENS, Forst. Char. Gen. 26; t. 13. *Leaves* obovate-spathulate or oblanceolate, one-nerved, puberulous, .2 to .3 in. long, and less than .1 in. broad. *Flowers* .25 to .3 in. long. *Calyx*-tube somewhat compressed, shorter than the 5-toothed erect limb. *Corolla* longer than the calyx. *Style* bifid nearly to the base. *Capsule* pellucid-hispid or glabrous, somewhat compressed, broadly ovoid, with 2 vertical grooves, about .1 in. long, crowned by the membranous calyx-tube. Roxb. Fl. Ind. I. 532; Wall. Cat. 6206; W. & A. Prod. Fl. Penins. Ind. 405; Dalz. & Gibs. Fl. Bomb. 115; Hook. fil. Fl. Br. Ind. III. 42. *Oldenlandia repens*, Linn. Mant. 40. *Hedyotis repens*, Lam. Ill. 1424 (not of Don). *Lipaya telephioides*, Endl. Atakt. t. 13.

In moist spots near cultivation: in all the provinces.

11. ARGSTEMMA, Wall.

Small, delicate, flaccid or somewhat fleshy herbs, glabrous or pilose, the hairs sometimes jointed. *Leaves* usually membranous, the leaves in pairs, equal or very unequal, opposite or sub-verticillate. *Stipules* entire, persistent, or obsolete. *Flowers* in pedunculate cymes or umbels. *Calyx*-tube short, campanulate, turbinate or obconic: its lobes usually 4 or 5 (sometimes 3-7). *Corolla* white, rotate, with 4 or 5 valvate lobes. *Stamens* 4 or 5; anthers large, elongate, free, connivent or coherent, erect or declinate, dehiscing by 1 or 2 terminal pores or by longitudinal slits; filaments short. *Ovary* 2-celled; ovules numerous on placentas projecting from the septum. *Style* filiform, stigma capitellate. *Capsule* membranous or coriaceous, 2-celled, many-seeded, dehiscence valvular or opercular. *Seeds* minute, angled or compressed; testa reticulate or muriculate, punctate; embryo very small, in dense fleshy albumen.—**DISTRIB.** Species about 40 or 50, mostly from mountains, in sub-tropical Asia and in Malesia.

Leaves of the pairs equal in size, or one smaller but not minute:—

Leaves numerous, in a pseudo-whorl near the apex of the stem 1. *A. acuminatum*.

Leaves a single pair at the apex of the stem:—

Flowers .15 in. long 2. *A. pictum*.

Flowers .3 in. long 3. *A. subinequale*.

Leaves two pairs at the apex of the stem 2. *A. pictum* var.

tetraphylla.

- Leaves in a pseudo-whorl at the base of the stem ... 6. *A. nutans* var.
verticillata.
- Leaves numerous scattered along the whole length of the stem:—
- Leaves glabrous:—
- Leaves thickly membranous, narrowly elliptic, acute at the base ... 4. *A. Yappii*.
- Leaves thinly membranous, broadly ovate, the base widely cordate ... 5. *A. membranaceum*.
- Leaves more or less pubescent:—
- Cymes dense, many-flowered:—
- Leaves oblong-elliptic, oblong, or elliptic, sub-acute, flowers drooping in bud ... 6. *A. nutans*.
- Leaves broadly oblanceolate, shortly acuminate; flowers erect in bud ... 7. *A. urticifolium*.
- Cymes lax, few-flowered ... 8. *A. Ridleyi*.
- Leaves of the pairs very unequal, the smaller one minute and about equal to the stipules:—
- Leaves a single pair at the apex of the stem:—
- Corolla with narrow buds, its lobes lanceolate; anthers with apical appendages longer than themselves, the filaments thick; leaves with 5 or 6 pairs of main-nerves ... 9. *A. unifolium*.
- Corolla ovate in bud; its lobes boldly nerved, ovate; anthers sessile, their apical appendages short: leaves with 9 to 14 pairs of main-nerves ... 10. *A. unifolioloide*.
- Leaves several pairs crowded near the apex of the (often short) stem, pubescent; flowers .35 to .4 in. long, glabrous: calyx-lobes short, acute; calyx and corolla glabrous ... 11. *A. spinulosum*.
- Leaves scattered along the whole length of the stem:—
- Leaves more or less pubescent on both surfaces, the lower not glaucous: calyx hairy and corolla glabrous externally ... 12. *A. Elatostemma*.
- Leaves pubescent on both surfaces; or if glabrescent (var.) the midrib, nerves and edges with a few short, thick hairs; calyx and corolla pubescent externally ... 13. *A. involucreatum*.
- Leaves quite glabrous, succulent:—
- Leaves linear-oblong; main-nerves obscure ... 14. *A. Curtisii*.
- Leaves elliptic- or oblanceolate-oblong; with 7 to 12 pairs of main-nerves ... 15. *A. subcrassum*.
- Leaves glabrous on both surfaces, occasionally with a few adpressed hairs, not glaucous beneath:—
- Leaves thinly membranous, broadly oblanceolate, flowers in terminal umbels ... 16. *A. perakense*.
- Leaves thickly membranous:—
- Leaves with broad, obliquely pseudo-cordate bases ... 17. *A. oblongum*.

Leaves with narrow bases never pseudo-cordate:—

- Stem terete, scurfy; leaves more or less oblanceolate, 1·35 to 4·5 in. long: flowers 4 in. long: calyx-lobes broad, ovate ... 18. *A. ophirens*.
 Stem angled, not scurfy: leaves lanceolate, 2 to 3 in. long: calyx-lobes lanceolate, acuminate ... 19. *A. Wrayi*.

Leaves glabrous except the midrib and nerves, under surfaces glaucous:—

- Leaves distinctly petiolate, ovate, or oblong-lanceolate, unequal but not cordate at the base, 75 to 1·35 in. long: calyx campanulate ... 20. *A. Hookeri*.
 Leaves sessile or very nearly so, elliptic-oblong, unequal and cordate at the base, 1·5 to 2·15 in. long: calyx rotate ... 21. *A. bicolor*.

1. ARGOSTEMMA ACUMINATUM, King n. sp. Glabrous except occasionally for a few scattered minute pale hairs on both surfaces of the leaves; about 12 in. high. *Stem* erect, unbranched, twice as thick as a crow-quill when dry, obscurely 4-angled or minutely winged, naked. *Leaves* crowded near the apex of the stem, thinly membranous when dry, very unequal; the larger of each pair oblong-lanceolate, sometimes sub-oblique or sub-falcate, the apex acuminate, gradually narrowed from above the middle into a petiole of varying length; both surface glabrous; drying of a deep olivaceous colour, the midrib broad and rather distinct and the 10 to 15 pairs of curved spreading nerves indistinct; length 3·5 to 6·5 in.; breadth 1 to 1·5 in.; petioles 1 to 4 in.; the smaller leaf of the pair sessile, sub-rotund, under 1 in. long. *Stipules* usually with broad bases and acuminate apices about the same length as the smaller leaf. *Cymes* terminal, about half as long as the leaves, pedunculate, di- or tri-chotomous; the peduncle and branches slender, slightly swollen and bracteolate near the divisions. *Flowers* few, 3 in. long on capillary pedicels longer than themselves and bracteolate at the base. *Calyx* campanulate with 5 broad, blunt, spreading lobes. *Corolla* nearly three times as long as the calyx, its lobes slightly shorter than the staminal cone: *anthers* linear-lanceolate, acuminate, dehiscing longitudinally, the connective forming narrow marginal wings and long flattened, apical appendages. *Style* somewhat longer than the anthers: stigma clavate. *Capsules* almost hemispheric, crowned by the obscurely toothed cupular remains of the calyx, smooth, 15 in. in diam. *Seeds* rather large for the genus, angled, pitted, black.

PENANG: *Wallich*. SELANGOR: *Ridley* 8233.

This plant was collected 65 years ago in Penang by Wallich, and until Mr. Ridley obtained it in Selangor it does not appear to have been found since. In the

Flora of British India it has been put under *A. verticillatum*, Wall.—a species originally described by Wallich from the Nepal Himalaya, from which species this differs amongst other things in its larger size and more numerous leaves.

2. ARGOSTEMMA PICTUM, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. II. 327. A succulent herb 3 to 5 in. high. *Stem* 1 to 2 in. long, twice as thick as a crow-quill, ebracteate, glabrous. *Leaves* a single pair at the apex of the stem, membranous, sub-equal, broadly or rotund-ovate, sub-acute or obtuse; the base broad, sub-truncate or slightly cordate, upper surface blackish-brown when dry, glabrous or with sparse, short, thick hairs, the midrib and nerves faint (when dry); lower surface paler, glabrous or with a few coarse hairs on the 4 or 5 pairs of rather straight, ascending, broad, flat main-nerves; midrib broad, flat; length 1·5 to 3·5 in.; breadth 1·25 to 2·5 in.; petiole under ·1 in. or none. *Stipules* lanceolate or ovate, acute, ·2 to ·3 in. long. *Umbel* solitary, terminal, on a slender, ebracteolate peduncle, more slender than the stem and from ·75 to 2 in. long. *Flowers* from 8 to 12, drooping in bud, ·15 in. long (to the end of the exerted style), on pedicels more than twice as long, with a whorl of small bracteoles at their bases. *Calyx* narrowly campanulate, coarsely puberulous, with 5 acute, triangular, erect lobes. *Corolla* nearly twice as long as the calyx, its 5 lobes oblong, obtuse, reflexed, rather longer than the stamens. *Anthers* free, oblong, blunt, dehiscing longitudinally, not apiculate, the base bifid, the connective behind the cells thickened; filament short, broad, thick. *Style* filiform, longer than the anthers: stigma small, capitate. Wall. Cat. 8392: Benn. Pl. Jav. Rar. 94: Hook. fl. Fl. Br. Ind. II. 43.

PERAK: *King's Collector* 3105, 3110, 10585, 10586; *Scortechini* 310; *Wray* 1202. PENANG: *Curtis* 480. MALACCA: *Maingay* (K.D.) 896.

VAR. *tetraphylla*. Leaves in two unequal pairs, or three in a whorl.

PERAK: *Wray* 1202.

3. ARGOSTEMMA SUBINEQUALE, Benn. Pl. Jav. Rar. 95. Glabrous; succulent when fresh, 4 to 8 in. high: *stem* fleshy when fresh, thinner than a goose-quill, 1·5 to 4·5 in. long, ebracteolate. *Leaves* membranous, only a single pair, somewhat unequal (rarely a whorl of three) broadly ovate-oblong to ovate-elliptic, acute or bluntly acuminate, the base truncate and broad or slightly cuneate; upper surface brown when dry, glabrous, the nerves and midrib indistinct; lower surface paler, glabrous except for a few hairs on the broad flattened midrib and 5 or 6 pairs of broad, flat, obliquely ascending main-nerves; length of the longer leaf 4 to 6 in.; breadth 2·5 to 3·5 in.; of the smaller leaf 2 to 3 in.; breadth 1·75 to 2 in.; petioles ·1 to ·2 in. *Stipules* lanceolate, ·3 to ·75 in. long. *Cymes* umbellate, terminal, solitary or in pairs, pedunculate; peduncles slender, bearing a pair or whorl of lanceolate bracteoles near the middle.

Flowers 3 in. long, numerous, on pedicels shorter or longer than themselves, pubescent, bracteolate at the base. *Calyx* campanulate; the tube small, narrow; the 4 lobes thin, lanceolate, much longer than the tube. *Corolla* longer than the calyx; its lobes 5, imbricate, ovate-lanceolate, acute, spreading slightly, imbricate. *Anthers* alternately quite free, at first slightly cohering in the upper half, linear, not winged but with a flattened, 2-pored apical appendage, the bases thickened and cordate: filaments free, nearly half as long as the anthers. *Style* as long as the anthers; stigma filiform.

PERAK: *King's Collector* 2242.—DISTRIB. Sumatra.

4. ARGOSTEMMA YAPPII, King n. sp. Glabrous; stem erect, unbranched, 6 to 12 inches high, succulent, when dry nearly as thick as a goose-quill at the base, tapering rapidly upwards. *Leaves* almost equal in size, thick (almost fleshy when fresh), elliptic, narrowed pretty equally at both ends, shining, upper surface pale-olivaceous, minutely scaly when dry, the lower olivaceous yellow, the midrib distinct and the 6 to 8 pairs of spreading main-nerves indistinct on both: length 2 to 3.5 in.; breadth .75 to 1.35 in., petiole .15 to .5 in., winged in its upper half. *Stipules* free, ovate-oblong, blunt, .4 to .7 in. long. *Cymes* terminal, trichotomous, on pedicels exceeding an inch in length, with a whorl of bracteoles at the apex and (like the branches) pink when fresh, branches often trichotomous. *Flowers* few, .5 in. long, on slender pedicels longer than themselves. *Calyx* campanulate; the lobes 5, triangular, acute, spreading, as long as the tube. *Corolla* more than twice as long as the calyx, green; its 5 lobes oblong-lanceolate, sub-acute, spreading, much longer than the short tube and slightly longer than the staminal cone. *Anthers* lanceolate, dehiscing longitudinally, coherent by the marginal wings of the connective, shortly apiculate, slightly shorter than the filiform style: stigma small.

PERAK: *Scortechini* 245, 1334; *Wray* (no number); *Yapp* 435.

Named in honour of Mr. R. H. Yapp who, as botanist, accompanied an exploring party sent to the Malayan Peninsula by the University of Cambridge.

5. ARGOSTEMMA MEMBRANACEUM, King n. sp. Glabrous; except for a few slender adpressed hairs on the upper surface of the leaves and on the calyx and pedicels. *Stem* erect, 8 to 10 in. high, thinner than a goose-quill, angled. *Leaves* sub-equal, few, scattered, large, thinly membranous, green when dry, slightly unequal-sided, the apex sub-acute; the base broadly ovate-cordate, main-nerves 4 or 5 pairs, the lower one branched on the side and spreading, the upper ascending, all distinct and pale on both surfaces, length 2.5 to 5 in.; breadth 1.5 to 3.5 in.; petiole about as long as the blade. *Cymes* axillary and terminal, condensed, 6- to 12-flowered, on long, slender, sometimes puberulous

peduncles, bearing 1 or 2 small leaf-like bracts near the apex, otherwise naked. *Calyx* broadly ovoid, about .1 in. long, puberulous, the tube broadly ovoid, the teeth narrowly lanceolate; pedicel nearly as long and also puberulous. *Corolla* unknown.

PENANG: *Curtis* 955.

6. ARGOSTEMMA NUTANS, King n. sp. *Stem* erect, 4 to 12 in. high, sometimes decumbent and rooting at the base, thicker than a crow-quill, bearing many scurfy but deciduous hairs. *Leaves* somewhat unequal but not conspicuously so, membranous, oblong, elliptic, or elliptic-oblong, occasionally slightly obovate, often more or less oblique, the apex acute, the base cuneate rarely rounded; upper surface dark olivaceous-brown, densely and uniformly adpressed glandular-hispidulous; the lower surface paler, coarsely pubescent on the midrib and nerves; almost glabrous between; main-nerves 5 to 8 pairs, curved, spreading and ascending, rather prominent on the lower surface only; length from 1.75 to 4 in.; breadth .75 to 2 in.; petioles .2 to .8 in., pubescent. *Stipules* ovate-lanceolate, .15 to .25 in. long, deciduous. *Umbels* cymose, terminal, usually solitary, on deciduous, pubescent peduncles, 1 to 2.5 in. long, surrounded at their bases by a whorl of lanceolate, small, pubescent bracteoles; many-flowered. *Flowers* .3 in. long, pendulous on pubescent pedicels 2 or 3 times as long as themselves. *Calyx* campanulate; the tube short, densely hairy outside: the lobes 5, ovate, sub-erect, longer than the tube, almost glabrous. *Corolla* slightly longer than the calyx, sparsely glandular-hairy outside; the 5 lobes membranous, reflexed, lanceolate, acute, longer than the *stamens*. *Stamens* 5, free, basifixed by the short flat filaments opposite the lobes of the corolla; *anthers* linear, dehiscent longitudinally, the connective coriaceous, with a short broad slightly notched apical appendage. *Style* filiform; stigma small, slightly exserted. *Capsules* erect, ovoid-globular, ridged, hairy, crowned by the short erect calyx-teeth, 2-celled, many-seeded, .05 in. in diam.

PERAK: *Wray* 843, 1296; *King's Collector* 585, 7190, 7802, 8060; *Scortechini* 157.

VAR. 1 *glabra*. Only a few inches high; all parts glabrous; *leaves* with shorter petioles and less narrowed at the base than in the type.

PERAK: *Scortechini* 297; *Wray* 2646; *King's Collector* 1985.

VAR. 2 *verticillata*. Only a few inches high; glabrous; *leaves* few (often only a single pair) lying flat on the ground: peduncle of umbel several times longer than the leaves; *umbels* often few-flowered.

PERAK: *Scortechini* 310; *King's Collector* 427, 1920.

7. ARGOSTEMMA URTICIFOLIUM, n. sp. King. *Stem* decumbent and rooting at the base, 8 to 12 in. long, thinner than a goose-quill and scurfy when dry. *Leaves* membranous, somewhat unequal in size;

broadly oblanceolate, shortly acuminate, cuneate and sometimes slightly unequal at the base; upper surface dark-brown with sparse, coarse, glandular, bulbous hairs, the midrib and main-nerves obscure; lower surface paler, with many glandular hairs on the bold midrib and slightly prominent 7 or 8 pairs of spreading, slightly curved main-nerves; the interspaces with a few similar hairs, minutely papillose; length of larger leaf of the pair 3 or 4 in.; of the smaller 2 to 2.5 in.; breadth of the larger 1.7 to 2 in.; of the smaller .9 to 1.2 in.; petioles from .3 to .7 in., glandular-pubescent. *Cyme* umbellate, terminal, solitary, 10- to 12-flowered, pedunculate; the peduncle 4-angled, scurfy like the stem and also glandular-hairy. *Flowers* on deciduously hairy pedicels, .3 to .4 in. long, bracteolate at the base. *Calyx* globular-campanulate, densely glandular-hairy outside; the teeth short, erect, acute, fleshy, glabrous inside; disk large tumid. *Corolla* unknown. *Capsule* globular, crowned by the small erect calyx-teeth and the disk hairy at first, but becoming glabrous; 2-celled, the placentas axile. *Seeds* numerous, triangular, pitted, black.

PERAK: *Scortechini*.

This appears to be the same species as one of Beccari's Sumatra plants (Herb. Becc. Argostemma 33).

8. ARGOSTEMMA RIDLEYI, King n. sp. Stem decumbent or prostrate rooting in its lower half, about as thick as a crow-quill, 6 or 8 in. long, 4-angled, softly rusty-pubescent. *Leaves* in each pair slightly unequal, membranous, narrowly oval or oval-oblong, acute, the base cuneate; upper surface darkly olivaceous, densely and coarsely pubescent on the midrib and nerves and with some scattered hairs on the spaces between; lower surface paler, the pubescence on the midrib and 5 or 6 pairs of main-nerves not so coarse as on the upper, the reticulations with a single row of hairs, the areolæ glabrous, but with minute white scales; length .8 to 1.8 in.; breadth .4 to .8 in.; petioles .15 to .6 in., densely and coarsely pubescent. *Stipules* lanceolate to broadly ovate, their apices acute and bifid, about .2 in. long. *Cyme* terminal, solitary, pedunculate, longer than the leaves, umbellately 2-3-flowered; rusty-pubescent in all its parts; peduncle .75 to 1.5 in. long, bearing a whorl of bracteoles about the middle and another at the base of the pedicels. *Flowers* .4 in. long, their pedicels much longer. *Calyx* campanulate with 5 broad spreading ovate-acute lobes slightly longer than the tube. *Corolla* unknown. *Capsules* obconic, crowned by the prominent calyx-teeth, .15 in. in diam., pubescent. *Seeds* numerous, small.

MALACCA: *Ridley* 10110.

9. ARGOSTEMMA UNIFOLIUM, Benn. Pl. Jav. Rar. 94. Rhizome short, fleshy; whole plant glabrous, succulent, 6 to 8 in. high. *Stem*

simple, erect, bearing, about or below the middle, a pair of lanceolate bracts about .2 in. to .4 in. long and, at the base of the peduncle, a whorl composed of a single pair of very unequal thin membranous (when dry) leaves and a pair of stipules; the larger leaf broadly ovate, shortly acuminate, the base rounded or cordate; when dry the upper surface dark brown, the midrib broad and channelled, the nerves elevated; lower surface pale brown, the midrib and 5 or 6 pairs of spreading slightly curved nerves slightly prominent; length 3 to 6 in.; breadth 1.5 to 3 in.; petiole .4 to .8 in. Smaller leaf sessile, ovate-lanceolate, acute, 1-nerved, .2 to .5 in. long. *Stipules* similar to smaller leaf. *Cymes* terminal, simply or compoundly and laxly *umbellate*, few- or many-flowered; peduncle slender, 1.5 to 8 in. long, with a whorl of narrow bracteoles at the origins of the branches. *Flowers* narrow in bud, .25 in. long; their slender pedicels slightly longer, sometimes lengthening in fruit. *Calyx* under .1 in. long, campanulate, with broad, blunt, thick, short, spreading lobes. *Corolla* narrow in bud, more than twice as long as the calyx; its 5 lanceolate lobes slightly shorter than the erect staminal cone. *Anthers* lanceolate, the cells narrowly linear, cordate at the base, edged by the cohering wings formed by the connective and surmounted by membranous, flat, apical appendage longer than themselves; filaments short, thick, curved. *Capsule* hemispheric, crowned by the rather large calyx, subglabrous, .1 in. in diam., 2-celled, dehiscence circumscissile. Hook. fil. Fl. Br. Ind. III. 45.

JOHOR: *Ridley* 3730. PENANG: *King*; *Curtis* 990; *King's Collector* 2276. MALACCA: *Maingay* (K.D. 895).

10. ARGOSTEMMA UNIFOLIOLLOIDE, King n. sp. Rhizome woody; stem fleshy when fresh, glabrous, thinner than a goose-quill and angled when dry, 3 to 7 in. high, bearing one or more pairs of lanceolate, glabrous bracts about .25 in. long, and at the base of the peduncle a pair of very unequal membranous leaves and a pair of stipules all in a whorl; the longer leaf sessile, broadly ovate or ovate-rotund, shortly acuminate, the base rounded or cordate; upper surface dark brown when dry, with sparse, coarse, glandular hairs or (in var. *glabra*) glabrous; lower surface pale brown, the broad midrib and main-nerves sparsely glandular-pubescent, otherwise glabrous; main-nerves 9 to 14 pairs, curved, spreading, slightly prominent on both surfaces (when dry) but chiefly on the lower; length 5.5 to 10 in.; breadth 3.5 to 6.5 in.; smaller leaf sessile, narrowly ovate, acute, about .5 in. long; the stipules similar but usually narrower. Inflorescence terminal, solitary, pedunculate, paniculately umbellulate, lax, usually many flowered; peduncle and branches glabrous, fleshy when fresh and somewhat stout; bracteoles in whorls (usually of 4), oblong obtuse, concave, connate at the base, about .3 in. long. *Flowers*

rather broad in bud, .2 to .25 in. (sometimes .4 in.) long, the pedicels varying in length, the ultimate umbellules with rather large, broad, blunt bracteoles at the base. *Calyx* under .1 in. long, campanulate, the lobes 5, broad, blunt, thick, spreading. *Corolla* several times longer than the calyx, broadly ovate and angled in bud; the 5 lobes ovate, acute, boldly 1-nerved, longer than the cone of anthers, spreading or reflexed. *Anthers* almost sessile, narrowly linear-lanceolate, the connectival margin narrow and the apicular appendage short. *Capsules* somewhat fleshy, hemispheric, .1 in. in diam., crowned by the small calyx, 2-celled, the dehiscence circumscissile.

PERAK: at elevation of from 2,500 to 4,500 feet; *Scortechini* 282, 384; *Wray* 410.

VAR. *glabra*. *Leaves* glabrous on both surfaces.

PERAK: *Scortechini* 412, 1204; *Wray* 2814; *King's Collector* 5064; *Curtis* 3146.

This differs from *A. unifolium* in its corolla being broadly ovate in bud and having ovate, boldly 1-nerved lobes, in having its anthers almost sessile, with very long cells and short apical appendages. This has also larger leaves with more nerves which are sometimes hairy; its stems are also shorter and stouter.

11. ARGOSTEMMA SPINULOSUM, Clarke in Hook. fil. Fl. Br. Ind. III. 46. *Stem* only 3 to 8 inches long, nearly as thick as a goose-quill, decumbent and rooting at the base, obscurely 4-angled; with a few deciduous flexuose hairs. *Leaves* crowded, subcoriaceous, very unequal, the larger of each pair oblong-ob lanceolate, acute or acuminate, slightly narrowed from above the middle to the somewhat unequally-sided base; upper surface olivaceous, with a few thick, scattered hairs chiefly on the broad depressed midrib and near the edges, otherwise glabrous; the lower pale brown with many thinner hairs on the prominently raised broad midrib and on the nerves, and a few on the interspaces; main-nerves 10 to 14 pairs, curved, spreading, distinct on the lower surface, faint on the upper; length 2.5 to 5 in.; breadth 1 to 1.75 in.; petiole .2 to .5 in. Smaller leaf lanceolate to oblong, sessile, 3- to 5-nerved, .5 to .75 in. long. *Stipules* like the smaller leaves but shorter and with only one nerve. *Umbels* terminal, simple or compound, solitary or several, all on long peduncles shorter than the leaves, sometimes united at their bases; succulent, few-flowered, glabrous, 1.5 to 2 in. long; umbels or umbellules 3- or 4-flowered. *Flowers* .35 to .4 in. long, on slender pedicels of about the same length, with lanceolate scarious bracteoles at their bases, glabrous. *Calyx* campanulate; the limb with 5 triangular acute spreading lobes shorter than the tube. *Corolla* about twice as long as the calyx; its lobes broadly lanceolate, acuminate, shorter than the erect staminal cone: filaments short, curved; *anthers* linear-oblong,

dehiscing longitudinally; the connective with long linear apical process. *Capsule* obconic, smooth, .2 in. long, crowned by the calyx, 2-celled, 2-seeded. *Seeds* minute, dark brown.

PERAK: *Scortechini* 454, 500; *Ridley* 2920; *Wray* 463, 1083, 2910, 2953, 3936; *King's Collector* 2789, 2892, 7520. SELANGOR: *Ridley* 7409.

This species is closely allied to *A. Elatostemma*. It has, however, a shorter stem and larger fewer leaves.

12. ARGOSTEMMA ELATOSTEMMA, Hook. fil. Fl. Br. Ind. III. 45. *Stem* thinner than a goose-quill, 4 to 12 in. long, decumbent and rooting at the lower nodes, deciduously scurfy-hairy, sometimes becoming subglabrous. *Leaves* thickly membranous, very unequal; the longer one of the pair somewhat oblique, oblong-lanceolate; the apex broad or subacute, sometimes shortly apiculate, more or less narrowed from a little above the middle to the often somewhat unequally-sided or obliquely-cordate base, the edges not ciliate; upper surface glabrous or nearly so, the slightly depressed midrib and main-nerves sometimes puberulous; the lower surface minutely scaly, rusty adpressed-pubescent on the prominent midrib, reticulations, and 10 to 12 pairs (only 7 or 8 in var.) of slightly curved spreading main-nerves; length 1.25 to 2.25 in.; (shorter in var.); breadth .75 to 1 in.; petioles unequal, .15 to .2 in long, scurfy-pubescent; the smaller leaf ovate-lanceolate (broadly ovate in var.) sessile, .15 to .2 in. long, with 2 to 4 pairs of nerves. *Stipules* about the same in size and shape as the smaller leaves. *Corymbs* terminal, solitary, pedunculate, few-flowered, usually shorter than the leaves; the peduncles slender, minutely pubescent or sub-glabrous; bracteoles at the forks, minute. *Flowers* .4 in. long, on slender sometimes puberulous pedicels about as long as themselves. *Calyx* .1 in. long, pubescent, campanulate, with 5 triangular, spreading, acute lobes. *Corolla* white, glabrous, with 5 long lanceolate much reflexed lobes. *Anthers* linear-lanceolate, cohering by the narrow wings and long terminal appendage of the connective, erect, dehiscing by long vertical slits. *Style* long, slender, cylindric: stigma small, slightly exerted beyond the narrow staminal cone. *Capsule* pyriform, glabrous, crowned by the calyx-teeth, .2 in. long.

PENANG: *Hullett* 195; *Curtis* 962, 2250; *King's Collector* 1605, 1752. SINGAPORE: *Lobb* 295. MALACCA: *Griffith* (K.D.) 2876. PERAK: *Scortechini*; *Wray* 3334; *King's Collector* 2131.

VAR. *obovata*, King. *Leaves* obovate, minutely apiculate, the base obliquely cordate: upper surface with a few scattered, short, thick hairs, length .9 to 1.4 in.; breadth .5 to .75 in. *Corymb* 2- to 4-flowered, its peduncle pubescent, with a whorl of minute bracts near its apex.

PERAK: *King's Collector* 10815.

13. ARGOSTEMMA INVOLUCRATUM, Hemsl. in Hook. Icon. t. 1556. *Stems* thinner than a goose-quill, succulent, decumbent, 4 to 12 in. long with partially deciduous, long, flexuose, white hairs. *Leaves* membranous, very unequal in size, the larger of the pair obliquely and narrowly lanceolate or oblanceolate (linear-ovate-lanceolate or ovate in vars.) more or less narrowed to the slightly unequal base; both surfaces greenish or olivaceous-brown when dry, the lower paler, the upper more or less bulbous-strigose especially on the midrib and nerves: the under hispidulous, sometimes pitted, the edges shortly ciliate, main-nerves 7 or 8 pairs (in var., glabrous sometimes only 5 or 6 pairs) curved, spreading or ascending, slightly conspicuous when dry; length 1.25 to 3 in.; breadth .5 to 1.25 in.; petiole .1 to .4 in.; the smaller leaf ovate or ovate-lanceolate, 3-nerved, sessile, from .1 to .4 in. long. *Stipules* like the smaller leaves, but not cordate, free. *Flowers* .5 in. long, from 1 to 3 in a multibracteolate pubescent terminal raceme shorter than the leaves; the pedicels about as long as the flowers, hairy. *Calyx* densely hairy; the tube short; the 5 lobes many times longer, lanceolate, acuminate, spreading. *Corolla* with lobes like the calyx but slightly broader and less hairy, not reflexed. *Stamens* 5, erect; the filaments short, thick, curved, dorsifixed near the base of the linear-lanceolate, acuminate, apiculate, but not winged, longitudinally dehiscing anthers. *Capsule* small, compressed, obovoid, crowned by the long spreading calyx-teeth, 2-celled, 2-seeded: *seeds* compressed, brown.

PERAK: *King's Collector* 2204, 2820, 8062. PENANG: *Ridley* 10273; *Curtis* 342, 3148; Gunong Tahan, *Yapp*.

VAR. *mollis*, King. *Leaves* usually more than 1 in. broad, obliquely ovate-lanceolate, acuminate, the under surfaces and inflorescence with soft flexuose rather coarse hair.

PERAK: *Ridley* 2927; *King's Collector* 2898; *Scortechini* 38.

VAR. *glabrescens*, King. *Leaves* linear-lanceolate to oblanceolate, rarely ovate, glabrous except for a few stiff strigose hairs on the midrib and main-nerves; .9 to 2 in. long.

PERAK: *Scortechini* 303, 455; *Ridley* 9763; *King's Collector* 2714; *Wray* 696.

The bracteoles on the inflorescence often form an involucre at the bases of the pedicels, hence the specific name.

14. ARGOSTEMMA CURTISII, King n. sp. All parts quite glabrous; *stems* succulent, decumbent, glabrous, reddish when fresh, rooting in the lower part, thicker than a crow-quill when dry; 4 to 8 in. long. *Larger leaves* succulent, unequal; the larger linear-elliptic, much attenuated to either end, the apex gradually acuminate, the base more abruptly so; both surfaces olivaceous when dry, the lower the paler; main-nerves

invisible; the midrib depressed on the upper surface, prominent on the lower; length 1·25 to 2·75 in.; breadth ·1 to ·4 in.; petiole ·1 to ·25 in.; the smaller leaves linear, ·3 in. long. *Stipules* like the smaller leaves but somewhat shorter and broader. *Cymes* terminal, pedunculate, shorter than the leaves, 2- 4-flowered. *Peduncles* slender, longer than the pedicels, with one or two whorls of small lanceolate bracteoles; pedicels longer than the flowers, bracteolate at the base. *Flowers* ·35 in. long, white. *Calyx* campanulate; with 5 triangular, acute, spreading teeth as long as the short tube. *Corolla* with 5 spreading lanceolate, acuminate lobes twice as long as the calyx. *Stamens* 5 in an erect cone; the filaments short, thick, curved; *anthers* linear-lanceolate; the connective margined and apiculate.

PERAK: *Scortechini* 1890. PENANG: *Curtis* 3332.

15. ARGOSTEMMA SUBCRASSUM, King n. sp. A glabrous herb 12 to 18 in. high; *stems* succulent, thinner than a goose-quill when dry, little branched, decumbent near the base, ascending, covered with a layer of smooth, oblong scales. *Leaves* very unequal, membranous; the larger of each pair membranous when dry, succulent when fresh; elliptic- or oblanceolate-oblong, somewhat oblique, acuminate, narrowed at the base; both surfaces olivaceous-brown when dry, the lower the paler; main-nerves 7 to 12 pairs, ascending, much curved, faint on both surfaces when dry; the midrib raised on the upper surface, flat and broad on the lower; length 3·5 to 7 in.; breadth 1 to 1·5 in.; petioles ·1 to ·3 in.; slightly winged. *Smaller leaf* ovate-cordate, sessile, only ·1 to ·25 in. long. *Stipules* like the small leaves but smaller. *Cymes* with few or many umbellate branches, the ultimate branches few-flowered, lax; the branches with small lanceolate bracteoles at the forks. *Flowers* ·4 or ·5 in. long, on slender pedicels as long as themselves and minutely bracteolate at the base. *Calyx-tube* short, campanulate, its 5 lobes thick, short, broadly ovate, blunt or acute, spreading. *Corolla* three times as long as the calyx; its 5 lobes lanceolate, ·25 in. long, spreading. *Stamens* conjoined in an erect cone longer than the corolla; *anthers* linear-lanceolate, the connective with a long terminal process half as long as the anther; filaments short, thick, curved, dorsi-fixed near the base of the anther. *Capsule* obovoid-globular, truncate, crowned by the calyx, smooth, 2-celled, many-seeded.

PERAK: *Scortechini* 1203, 1912; *King's Collector* 10154; *Ridley* 9762. SELANGOR: *Ridley* 7408.

16. ARGOSTEMMA PERAKENSIS, King n. sp. *Stem* erect, unbranched, with the peduncle 8 in. high, thicker than a crow-quill, bearing a few scattered coarse hairs near the base, otherwise glabrous. *Leaves* 2 pairs, thinly membranous, very unequal; the larger oblanceolate-elliptic,

the apex acuminate, the base much narrowed; both surfaces dirty olivaceous when dry, glabrous; main-nerves 5 or 6 pairs, ascending, faint; length 2·5 to 3·5 in.; breadth 1·2 to 1·5 in.; petiole ·4 in.; winged near the apex: smaller leaf about ·1 in. long, lanceolate, sessile. *Peduncle* terminal, erect, 3 in. long; minutely hairy, with a whorl of lanceolate bracts near its base and another ·2 in. long at the base of the 10- to 12-flowered terminal umbel. *Flower-pedicels* about ·3 in. long, slightly unequal, flattened, sub-glabrous. *Calyx* with a broadly ovate-rotund puberulous tube ·1 in. long, and 5 minute radiating teeth. *Corolla* unknown.

PERAK: *Ridley* 110.

17. ARGOSTEMMA OBLONGUM, King n. sp. *Stem* 6 to 15 in. high, slightly branched, half as thick as a goose-quill, rooting in its lower part, covered with scaly deciduous pubescence. *Leaves* membranous, very unequal; the larger of each pair elliptic to oblong, acute, the base rounded and slightly and obliquely cordate; upper surface brownish, olivaceous, everywhere glabrous, the midrib depressed; the lower pale, glabrous except the midrib and 6 to 8 pairs of curved spreading slightly prominent main-nerves; length 2 to 3 in.; breadth 1 to 1·35 in.; petiole ·1 to ·2 in.; smaller leaf sessile, ovate-oblong or ovate-cordate, ·25 to ·4 in. long: *stipules* like the smaller leaf but not so large. *Cymes* few-flowered, solitary, pedunculate, terminal or from the upper axil, shorter than the leaves, with very few, shortly pubescent branches, often with a whorl of lanceolate bracts below the middle of the peduncle and at the base of the umbels. *Flowers* ·25 in. long, on pubescent pedicels of about the same length. *Calyx* pubescent, campanulate, with 5 short, triangular, acute, spreading teeth. *Corolla* twice as long as the calyx, slightly hairy outside; the lobes broadly lanceolate, nerved, reflexed. *Stamens* 5, coherent in an erect cone slightly shorter than the corolla. *Anthers* dehiscing longitudinally; the connective forming marginal wings and a long flat apical process slightly recurved at the point; filaments short, curved, thick, attached to the back of the anther near its base. *Capsule* sub-globular, crowned by the slightly enlarged calyx-lobes, minutely pubescent, ·1 in. in diam. *Seeds* numerous, angled, black, large in size for the genus.

PERAK: *King's Collector* 907, 10261, 10675; *Scortechini* 159.
SELANGOR: *Ridley* 7410. JOHOR: *King*.

18. ARGOSTEMMA OPHIRENSE, Maing. ex Hook. fil. Fl. Ind. III. 45. *Stem* ascending, rooting at the base, little-branched, minutely nodose, succulent, terete and thicker than a crow-quill when dry, deciduously scurfy-hairy, 4 to 10 in. high. *Leaves* sub-coriaceous, glabrous but occasionally with a few scattered hairs on the midrib, very unequal, the

larger of each pair oblanceolate or elliptic-oblanceolate or elliptic, often more or less oblique, acuminate or acute, narrowed to the base; upper surface olivaceous when dry; the lower pale brown, sometimes scurfily puberulous on the short midrib and nerves; main-nerves 5 to 8 pairs, curved, ascending, obscure on the upper but slightly prominent on the lower surface when dry; length 2 to 3.5 in.; breadth .7 to 1.25 in.; petiolé .1 to .35 in. *Smaller leaf* of the pair obliquely ovate-cordate, or lanceolate, acute, sessile, .1 to .2 in. long. *Stipules* like the small leaves but not so large. *Cymes* terminal, spreading, sometimes branched, solitary, usually shorter than, but sometimes as long as the leaves, glabrous, with whorls of small lanceolate or ovate bracteoles in the lower part of the 1 to 2 in. long peduncle and at the forks of the branches. *Flowers* .4 in. long; their pedicels about as long and minutely bracteolate at the base. *Calyx* pubescent, short, campanulate, with 5 broadly ovate spreading lobes half as long as the tube. *Corolla* more than twice as long as the calyx, glabrous; its 5 lobes lanceolate, shorter than the stamens, their edges waved. *Anthers* lanceolate, dehiscing longitudinally; connective forming narrow marginal wings and a long apical appendage. *Style* filiform, slightly exerted; stigma clavate. *Capsule* obconic, crowned by the broadly toothed calyx, .15 in. in diam.; *seeds* numerous, minute.

MALACCA: *Griffith* (K.D.); *Maingay* (K.D.) 897; *Ridley* 3210.
PERAK: *Wray* 2197.—DISTRIB. Borneo.

19. ARGOSTEMMA WRAYI, King n. sp. *Stem* procumbent, rooting at the nodes in the lower half, when dry 4-angled and somewhat thicker than a crow-quill, sparsely hairy in the upper, but glabrous in the lower part. *Leaves* of the pairs very unequal, membranous; the larger lanceolate, acuminate, narrowed and slightly unequal at the base; upper surface, when dry, dark olivaceous, glabrous, the midrib broad and depressed, the main-nerves obscure; under surface pale, reticulate, sparsely pubescent on the midrib and 6 or 7 pairs of curved ascending rather distinct main-nerves; length 2 to 3 in.; breadth .6 to .9 in.; petioles .3 to .4 in., puberulous: the smaller leaf sessile, ovate-lanceolate, .15 to .2 in. long. *Stipules* like the small leaf but not so large. *Cyme* terminal, shorter than the leaves, pedunculate, dichotomous, few-flowered. *Peduncle* about .5 in. long, glabrous, with a whorl of lanceolate glabrous bracteoles at its division into the 2 short branches. *Flowers* .25 in. long; their pedicels about as long, bracteolate at the base, pubescent. *Calyx* campanulate, puberulous, lobes deeply-lanceolate, acuminate, spreading, longer than the tube. *Corolla* nearly twice as long as the calyx, glabrous: its 5 lobes lanceolate, slightly longer than the staminal cone. *Anthers* linear-lanceolate, coherent by the narrow marginal wing

of the connective, the apex with a long flat process, stigma oblong, about as long as the anthers.

PERAK: elevation 3400 feet; *Wray* 1012.

20. ARGOSTEMMA HOOKERI, King n. sp. Stem slightly thicker than a crow-quill, decumbent and rooting in its lower part, obscurely 4-angled, 6 to 12 in. long, covered with long, soft, pale, flexuose hairs. *Leaves* thickly membranous, very unequal; the larger of each pair lanceolate, ovate-lanceolate or oblong, sub-acute or obtuse, somewhat narrowed to the unequal-sided base; upper surface (when dry) olivaceous, with a few scattered, thick, adpressed, pale hairs near the edges and on the midrib; the lower pale, glaucous; the broad midrib and somewhat prominent 5 or 6 pairs of curved spreading nerves scurfy and sparsely pubescent; length .75 to 1.35 in.; breadth .35 to .6 in.; petiole .1 to .2 in. *Smaller leaf* ovate-lanceolate, cordate, sessile; *stipules* like the smaller leaves. *Cymes* umbellately 2-3-flowered, terminal, solitary, on slender, sparsely pubescent peduncles, about 1.5 in. long, and with a whorl of narrow bracteoles about the middle. *Flowers* .3 in. long; their pedicels puberulous and bracteolate at the base. *Calyx* widely campanulate, tomentose outside, the 5 lobes broadly triangular, spreading, shorter than the tube. *Corolla* twice as long as the calyx, white, sparsely hairy outside; the 5 deep lobes lanceolate, acuminate, spreading or reflexed. *Anthers* lightly cohering by their exalate edges into an erect cone, lanceolate, the base acute and entire, the apex with a long, flat, minutely bifid appendage. *Style* filiform, longer than the anthers, stigma clavate. *Capsule* obconic, very hairy, .15 in. in diam. crowned by erect calyx-lobes. *A. parvifolium*, Hook. fil. (not of Benn.) Fl. Br. Ind. III. 45.

PENANG: *King's Collector* 1747, 1756. JOHOR: *King*.

21. ARGOSTEMMA BICOLOR, King n. sp. Whole plant 3 or 4 in. high. *Stem* erect, simple, as thick as a crow-quill, pubescent. *Leaves* thickly membranous, very unequal; the larger of each pair subsessile, elliptic or oblong, tapering to the sub-acute apex and to the oblique, minutely cordate base; when dry the upper surface pale-olivaceous and bearing a few adpressed hairs on the midrib and near the margins; lower surface pale-yellowish, minutely hairy on the midrib and 5 or 6 pairs of spreading, little-curved main-nerves; length 1.5 to 2.15 in.; breadth .65 to .85 in.; smaller leaf only .25 to .3 in. long, ovate, sessile. *Stipules* broad, rounded, shorter than the smaller leaf. *Peduncles* axillary or terminal, as long as or longer than the leaves, erect, adpressed-pubescent, bearing a whorl of ovate-lanceolate bracts at or below the middle and another at the base of the terminal 3- to 6-flowered (sometimes branched) umbel. *Flower-pedicels* .2 to .25 in. long, densely pubescent like the calyx.

Flowers .3 in. long. *Calyx* rotate, only .05 in. long; its lobes triangular, spreading. *Corolla* five times as long as the calyx, glabrous, rotate, its 5 lobes broadly oblong-lanceolate, sub-acute, spreading, puberulous. *Anthers* glabrous.

PERAK: *Curtis* (without number).

12. HEDYOTIS, Linn.

Erect, decumbent or climbing herbs, or undershrubs, with 4-angled or terete stems, the stipules free or united with the petioles to form a cup, often bristly on the edge. *Leaves* sometimes whorled, often with bold nerves. *Flowers* in terminal or axillary, often much condensed cymes, 4-merous. *Calyx* with a globose ovoid or turbinate tube, and 4 acute persistent lobes without interposed teeth. *Corolla* white or lilac, funnel-shaped or campanulate; the lobes 4, valvate, ovate to linear; the throat naked or hairy. *Stamens* 4, in the tube or throat of the corolla; *anthers* dorsifixed, oblong or linear. *Disk* fleshy, inconspicuous. *Ovary* two-celled, many-ovuled, the style filiform, stigma bifid or bilobed, rarely entire; *ovules* on sessile or pedicelled placentas attached to the septum at or below the middle. *Fruit* small, membranous coriaceous or crustaceous, septi- or loculi-cidal, or splitting into two separable or united, 2- or many-seeded cocci, or indehiscent. *Seeds* plano-convex, or angled, granulate or pitted, rarely winged; embryo sub-cylindric, in horny albumen, radical short.—DISTRIB. Species about 100, chiefly Tropical Asiatic.

Cymes pedunculate, umbellate or capitate, terminal or axillary:—

Scandent:—

Cymes umbellate, collected in a terminal leafy panicle; flowers distinctly pedicelled ... 1. *H. mollis*.

Cymes capitate, collected in a terminal leafy panicle; flowers on very short pedicels:—

All parts pubescent; flowers .1 in. long ... 2. *H. Prainiana*.

All parts glabrous; flowers .15 in. long ... 3. *H. capitellata*.

Erect or diffuse, herbaceous:—

Cymes capitate, solitary or in small axillary panicles shorter than the leaves; pubescent herbs ... 4. *H. vestita*.

Cymes umbellate, in small trichotomous axillary branches shorter than the leaves; glabrous erect herbs ... 5. *H. glabra*.

Cymes capitate, on slender axillary peduncles longer than the leaves; puberulous decumbent herbs ... 6. *H. stipulata*.

Erect woody glabrous shrubs:—

Cymes capitate, solitary, on stout peduncles much longer than the leaves ... 7. *H. peduncularis*.

- Cymes in terminal little-branched shortly pedunculate compound umbels 8. *H. Maingayi.*
- Cymes sessile, axillary, dense, capitate:—
- Leaves elliptic to ovate-lanceolate, 2·5 to 6 in. long and 1·5 to 3 in. broad (about twice as long as broad):—
- Flowers 4-merous, not glaucous beneath:—
- Leaves and corolla glabrous; shrubby, with herbaceous branches 9. *H. congesta.*
- Leaves rounded or abruptly narrowed at the base; main-nerves curved; flowers only 1 in. long ... 10. *H. macrophylla.*
- Leaves gradually narrowed to the base; nerves not curved; flowers 1·5 in. long 11. *H. Kunstleri.*
- Leaves narrowly elliptic to elliptic-lanceolate, 1 to 2 in. long, 3 to 8 in. broad (about three times longer than broad):—
- Stipules with numerous filiform bristles, much longer than the sheath; leaves sessile, with broad bases, their main-nerves 4 or 5 pairs, very faint ... 12. *H. connata.*
- Stipules with a few bristles, not much longer than the sheath; leaves at the base petiolate:—
- Main-nerves of leaves 4 to 6 pairs, straight, oblique, very prominent 13. *H. Auricularia.*
- Main nerves of leaves 3 or 4 pairs, curved, faint ... 14. *H. Havilandi.*
- Leaves linear-oblong or linear, many times longer than broad:—
- Leaves glabrous, sessile:—
- Leaves glabrous beneath; flowers 1·5 in. long; calyx obovoid-campanulate with 4 lanceolate-ovate spreading lobes; lobes of corolla short with thickened apices; anthers broadly ovate 15. *H. tenelliflora.*
- Leaves not glaucous beneath; flowers 2 in. long; calyx tubular-campanulate, with 4 ovate ciliate suberect lobes; lobes of corolla narrowly ovate, sub-acute; anthers oblong 16. *H. nitida.*
- Leaves with weak hispid hairs on the upper surface, glabrous on the lower, sessile; capsule sparsely pubescent 17. *H. pinifolia.*
- Leaves with both surfaces slightly scaberulous, shortly petiolate; capsule coarsely pubescent ... 18. *H. hispida.*

1. *HEDYOTIS MOLLIS*, Wall. Cat. 859. Scandent; the older stems terete, thickened towards the nodes, the younger 4-angled, grooved, softly but minutely pubescent like the branches of the inflorescence. *Leaves* membranous, lanceolate to elliptic-lanceolate, shortly acuminate, the base cuneate; upper surface olivaceous when dry, glabrous or subglabrous, the midrib often puberulous; lower surface paler and puberulous; main-nerves 3 or 4 pairs, ascending obliquely, little curved, slightly depressed on the upper and prominent on the lower surface like

the midrib; length 1.75 to 3.5 in.; breadth .6 to 1.15 in.; petiole .05 in. *Stipules* pubescent, short, broad, truncate, the upper edge bearing 3 or 4 stout black erect bristles. *Inflorescence* 1 to 1.75 in. long, terminal and from the upper leaf-axils, paniculate; the branches diverging, each with a minute linear bracteole at its base and at its apex a lax few-flowered umbel .4 in. in diam. *Flowers* about .15 in. long, their pedicels about as long or shorter. *Calyx* narrowly campanulate, glabrous; the mouth with 4 rather broad triangular teeth. *Corolla* about twice as long as the calyx, glabrous; the tube funnel-shaped; the mouth deeply divided into 4 oblong blunt teeth. *Capsules* narrowly obovoid, glabrous, crowned by the small spreading calyx-teeth, faintly 2-grooved, under .7 in. long. *Seeds* several in each cell, dark brown. G. Don Gen. Syst. III. 527; Hook fil. Fl. Br. Ind. III. 57.

PERAK: *Scortechini* 55; *King's Collector* 2704. PENANG: *Curtis* 1096.

VAR. *laxa*. *Inflorescence* 1.5 to 3 in. long, much more lax than in the type; flower-pedicels slender, often .15 in. long; flowers .2 in. long.

PERAK: *King's Collector* 2926. PENANG: *Curtis* 1096.

2. HEDYOTIS PRAINIANA, King n. sp. Scandent, at first green but ultimately olivaceous-brown when dry; young branches thinner than a goose-quill, broadly two-grooved, very slightly angled, uniformly clothed with short yellowish pubescence. *Leaves* thickly membranous, broadly lanceolate or narrowly elliptic, acute, the base narrowed into the petiole; both surfaces minutely pubescent; midrib prominent; main-nerves 4 or 5 pairs, rather straight, ascending; length 2 to 4 in.; breadth 1 to 1.5 in.; petioles .3 to .8 in. long, tomentose; the leaves of the inflorescence becoming smaller and with shorter petioles upwards, the uppermost pair sessile. *Stipules* broad at the base, the mouth with numerous long linear or lanceolate unequal lobes. *Inflorescence* a narrow panicle 6 to 15 in. long, with short simple or ternate spreading umbel-bearing branches .75 to 2.5 in. long, everywhere clothed with rather dense yellowish pubescence. *Umbels* capituliform, .3 to .5 in. in diam. when dry, bi-bracteolate at the base, 10- to 12-flowered. *Flowers* rather more than .1 in. long, on short pedicels about as long as their acute bracteoles. *Calyx* narrowly campanulate, with 4 long erect lanceolate lobes, pubescent outside like the corolla. *Corolla* slightly exserted, tubular, with 4 short broad teeth. *Stamens* 4, included; anthers narrowly ovate, filaments short. Fruit oblong, pubescent, the cocci plano-convex, each containing a large placenta and 2 or 3 large compressed seeds.

PENANG: *Curtis* 977.

Allied to *H. capitellata*, Wall., but pubescent and with flowers only half as large. *Scortechini* (Herb. 34) collected in Perak specimens in advanced fruit which may belong to this.

3. HEDYOTIS CAPITELLATA, Wall. Cat. 837 (in part). Scandent, glabrous, greenish when dry; young branches slender, 4-angled, the older usually terete. *Leaves* thickly membranous, lanceolate or elliptic-lanceolate, acuminate, the base more or less cuneate; lower surface darker than the upper; main-nerves 3 or 4 pairs, ascending, very little curved, rather prominent (like the midrib) beneath length 1·5 to 2·75 in.; breadth ·75 to 1·25 in.; petiole ·1 to ·15 in. *Stipules* short, broad, with long coarse teeth. *Inflorescence* paniced, pedunculate, mostly terminal; the primary branches trichotomous; the secondary branches divaricate, each bearing a linear reflexed bracteole at its base and at its apex a dense capitulum of flowers. *Flowers* ·4 in. long, sub-sessile. *Calyx* a little more than ·1 in. long, campanulate, ribbed; the mouth with 4 broad, ovate, lanceolate, acute spreading teeth, with a few hairs on their edges. *Corolla* tubular in bud, deeply divided into 4 narrowly oblong blunt spreading lobes, glabrous outside but with many coarse hairs inside. *Capsule* narrowly obovoid, sub-compressed, grooved, glabrous, a little more than ·1 in. long. *Seeds* several in each cell, black. G. Don Gen. Syst. III. 527; Kurz in Journ. As. Soc. Beng. 1877, II. 135 (excl. var. 7). Hook. fil. Fl. Br. Ind. III. 57. *Oldenlandia rubioides*, Miq. Fl. Ind. Bat. II. 353. *H. Finlaysoniana*, Wall. Cat. 6189.

In all the provinces; common.—DISTRIB. Malay Archipelago.

4. HEDYOTIS VESTITA, R. Br. in Wall. Cat. 847. A diffuse little-branched herb 1 to 4 feet long, all parts, except the upper surfaces of the leaves, softly pubescent; stems and branches slender, 4-angled and 4-grooved when dry. *Leaves* membranous, narrowly elliptic-lanceolate, more or less acuminate, the base narrowed; upper surface sparsely adpressed-pubescent; main-nerves 5 or 6 pairs, ascending obliquely, almost straight, depressed on the upper and prominent on the lower surface; length 2 to 3·5 in.; breadth ·6 to 1 in.; petiole ·15 to ·25 in.; *Stipules* short, broad, crowned by one to three bristly or subulate processes. *Inflorescence* axillary, consisting of few-flowered head-like umbellate cymes, on simple peduncles or in small panicles, bracteolate. *Flowers* about ·05 in. long, sessile or sub-sessile. *Calyx* cupular, with 4 deltoid or lanceolate, spreading, narrow acuminate lobes. *Corolla* blue or violet, funnel-shaped, hairy externally and in the throat, its lobes recurved. *Fruit* dry, sub-indehiscent, broadly turbinate or obovate, less than ·05 in. long; *seeds* numerous, compressed. G. Don Gen. Syst. III. 526; Hook. fil. Fl. Br. Ind. III. 58. *H. costata*, Kurz in Journ. As. Soc. 1877, II. 135 (not of R. Br.) *H. cœrulea*, Korth. in Ned. Kruidk. Arch. II. 160. *H. capituliflora*, Miq. Fl. Ind. Bat. II. 183. *Metabolus cœruleus*, Bl. Bijl. 992; DC. Prod. IV. 435. *M. lineatus*, Bartl. in DC. Prod. l.c. *Spermaceoce costata*, Roxb. Fl. Beng. 10; Fl. Ind. I. 370.

In all the Provinces.—DISTRIB. Sub-tropical Himalaya; Assam; Malay Archipelago.

5. HEDYOTIS GLABRA, R. Br. Wall. Cat. 848. A glabrous erect herb, 18 to 24 in. high; stems woody at the base, terete even when dry, slightly striate, thicker than a crow-quill, somewhat smaller near the nodes. *Leaves* linear-lanceolate tapering much to each end, when dry pale yellowish-olivaceous and with recurved edges; main-nerves 3 or 4 pairs, straight, oblique, ascending, prominent like the midrib on the lower and depressed on the upper surface, length 1.75 to 3 in.; breadth .15 to .4 in.; petiole .1 to .15 in. long. *Stipules* adnate to the petioles to form a campanulate cup with truncate mouth bearing a few long bristles. *Cymes* in small trichotomous axillary pedunculate panicles from .35 to 1.25 in. long, minutely puberulous, and minutely bracteolate. *Flowers* less than .1 in. long, on short pedicels of varying length. *Calyx* narrowly campanulate; the lobes spreading, triangular, sub-acute. *Corolla* tubular, its lobes oblong, blunt, sub-erect. *Fruit* globular, crowned by the calyx-lobes, about .1 in. in diam. Miq. Fl. Ind. Bat. II. 183; Hook fil. Fl. Br. Ind. III. 59. *Spermacoce glabra*, Roxb. Fl. Ind. I. 368. *Knoxia glabra*, DC. Prod. IV. 569.

PENANG: *Schomburgh*, King, *Deschamps*, *Ridley* 5749; *King's Collector* 1370. MALACCA: *Maingay* (K.D.) 892; *Griffith* (K.D.) 2885.—DISTRIB. British India.

6. HEDYOTIS STIPULATA, R. Br. in Wall. Cat. 6195 and 863a. *Stems* herbaceous decumbent, rooting, less than a foot high, branching; branches (when dry) slightly compressed, deeply 2-grooved, slightly 4-angled, puberulous. *Leaves* membranous, ovate to narrowly elliptic-oblong, the apex sub-acute, the base much narrowed to the short winged petiole; both surfaces olivaceous brown when dry; the upper glabrous; the lower paler, sparsely pubescent on the 3 or 4 pairs of spreading slightly curved little prominent main-nerves; length .75 to 1.75 in.; breadth .4 to .8 in.; petioles .2 to .3 in. *Stipules* cupular, short, the mouth wavy and bearing a few short bristles. *Peduncles* axillary and terminal, from half as long to as long as the leaves, each bearing a dense 3- to 6-flowered head about .35 in. in diam. (when dry). *Flowers* .15 in. long, sub-sessile. *Calyx* compressed, obovoid, glabrous, the lobes deep lanceolate, acuminate, spreading. *Corolla* short tubular, with oblong blunt broad lobes. *Anthers* oblong, large, sessile. *Capsules* longer than the flowers, broadly obovoid, almost reniform, compressed, glabrous, crowned by the enlarged triangular acuminate recurved calyx-lobes, dehiscent by apical valves; *seeds* numerous, brown. Hook. fil. Fl. Br. Ind. III. 63. *H. Lindleyana*, Hook. MSS. in W. & A. Prod. 409. *Oldenlandia japonica*, Miq. in Ann. Mus. Lugd. Bot. II. 194. *O. hirsuta*,

Linn. fl. Suppl. 127; DC. Prod. IV. 127. ?*Anotis capitata*, Korth in Ned. Kruidk. Nat. Gesch. II. 151.

PERAK: at 2000 feet, *Wray* 1450. PAHANG: *Ridley* 2233.—

DISTRIB. Java; British India.

7. *HEDYOTIS PEDUNCULARIS*, King n. sp. A low glabrous under-shrub; young branches slender, angled, slightly winged, shining, pale brown. *Leaves* coriaceous, linear-lanceolate, tapering acutely to each end, nerveless, the midrib strong; length 1·5 to 2·5 in.; breadth ·2 to ·35 in.; petiole ·15 to ·4 in., winged. *Stipules* with broad triangular bases, much acuminate, sparsely glandular hairy. *Peduncle* solitary, terminal, 2 to 4 in. long, bearing usually a single terminal dense, many-flowered capitulum ·75 in. in diam., sometimes with smaller capitules in the upper leaf axils; the terminal capitule with two deflexed leaf-like linear bracts. *Flowers* sessile or nearly so. *Calyx* ·15 in. long, coriaceous; its 4 lobes lanceolate, spreading, persistent in fruit. *Fruit* obovoid, ·1 in. long, the two cocci with tough integuments.

KEDAH: *Ridley* 5546.

8. *HEDYOTIS MAINGAYI*, Hook. fil. Fl. Br. Ind. III. 49. A low branching glabrous shrub; young branches slender, angled, slightly winged, greenish when dry. *Leaves* coriaceous, lanceolate, acute, the base rounded or slightly narrowed, nerves obsolete, the midrib bold; length 1·5 to 1·75 in.; breadth ·4 to ·6 in.; petiole ·05 to ·1 in. *Stipules* broadly triangular, acute, not acuminate, thick, persistent. *Cymes* terminal and axillary, on slender peduncles varying from ·25 to 1 in. in length; the terminal ones the longest; bracteoles thick, lanceolate; branches of inflorescence and flower-pedicels slightly winged. *Flowers* ·3 in. long, their pedicels under ·1 in. *Calyx* campanulate, deeply divided into 4 linear-lanceolate, acuminate, spreading lobes. *Corolla* salver-shaped; the limb extending beyond the calyx, divided into 4 oblong, blunt lobes. *Capsules* ovoid-globular, less than ·1 in. long, ridged, crowned by the deflexed calyx-lobes.

MALACCA: *Griffith*; *Lobb*, *Cuming* 2348; *Maingay* (K.D.) 887; *Ridley* 3211; *Derry* 619; *Hullett* 796. JOHOR: *Ridley*.

9. *HEDYOTIS CONGESTA*, R. Br. in Wall. Cat. 844. Shrubby glabrous, much-branched; branches thinner than a goose-quill, acutely 4-angled. *Leaves* thinly coriaceous, lanceolate ovate-lanceolate or elliptic, shortly acuminate, the base rounded or slightly cuneate, both surfaces pale brown tinged with yellow or green when dry: main-nerves 5 or 6 pairs, curved, spreading, indistinct on both surfaces when dry; length 2·5 to 5 in.; breadth 1·5 (rarely ·75) to 2 in.; petioles ·15 to ·35 in. *Stipules* triangular, much acuminate, nearly as long as the petioles, with many linear lobes, the middle one pectinate. *Cymes* sessile, axillary,

dense, many-flowered. *Flowers* under .15 in. long, surrounded by numerous scarious broad acute bracteoles. *Calyx* campanulate, .15 in. long, the mouth wide and divided into 4 large triangular sub-acute ciliate lobes. *Corolla* tubular, connected by the calyx-lobes, glabrous, the mouth with 4 lanceolate sub-acute much reflexed lobes. *Fruit* oblong, crowned by the large incurved calyx-lobes, glabrous, .15 in. long; *seeds* numerous. G. Don Gen. Syst. III. 525; Hook. fil. Fl. Br. Ind. III. 61. *H. argentea*, Wall. Cat. 858.

In all the provinces, common.—DISTRIB. Borneo; Sumatra.

VAR. *nicobarica*. Leaves narrowly elliptic, 3.5 to 5.5 in. long and .8 to 1.4 in. broad, much tapered at either end; the petioles .3 or .4 in. long; cymes half as long as the petioles, with fewer flowers than in the type. ? *H. carnosa*, Korth. in Ned. Kruidk. II. 161.

NICOBAR ISLANDS: *King's Collector* 506.

10. HEDYOTIS MACROPHYLLA, Wall. in W. & A. Prodr. 408 (excl. syn.) A low shrub; stem short, as thick as a swan-quill; branches thinner than a goose-quill, pale when dry, acutely 4-angled and sometimes winged, glabrous. *Leaves* membranous, shortly petioled, ovate or ovate-lanceolate, shortly acuminate or acute, the base broad, narrowed, or rounded; upper surface olivaceous when dry, glabrous, sometimes scaberulous; the lower pale brown, glabrous, sometimes puberulous on the midrib and nerves; main-nerves 6 or 7 pairs, curved, ascending, rather distinct; length 3 to 6 in.; breadth 1.5 to 3 in.; petiole .3 to .7 in. *Stipules* cupular, hairy, truncate, with 8 to 10 stout erect pubescent bristles. *Cymes* axillary, sessile, globular, many-flowered, densely crowded, .5 in. across. *Flowers* .1 in. long, sessile or shortly pedicelled, mixed with linear hairy bracteoles some of them longer than themselves. *Calyx* compressed, narrowly funnel-shaped, pubescent, the 4 lanceolate lobes as long as the tube. *Corolla* pubescent, shorter than the calyx-lobes; its lobes 4, broad, blunt. *Capsule* many-seeded, ovoid, hairy, not longer than the persistent calyx-lobes. Wall. Cat. 841; Hook. fil. Fl. Br. Ind. III. 54 (excl. syn.) *H. nodiflora*, Wall.

MALACCA: *Griffith* (K.D.) 2889 in part. PENANG: *Wallich*.

The description given above is founded on the Penang plant on which Wight and Arnot based the species. In the Kew Herbarium the species issued by Wallich as *H. nodiflora* (Cat. 855) has been put with this, the latter seems, however, to be a totally different species with much narrower leaves and smaller heads with fewer flowers.

11. HEDYOTIS KUNSTLERI, King n. sp. Herbaceous, erect, 12 to 18 in. high; stems glabrous, thinner than a goose-quill, acutely 4-angled. *Leaves* membranous, oblong-elliptic, tapering to each end but more gradually to the apex than to the base, both surfaces glabrous,

olivaceous, the lower paler, the upper slightly scaberulous; main-nerves 5 or 6 pairs, ascending obliquely, almost straight, slightly prominent on the lower surface; length 3·5 to 4·5 in.; breadth 1·5 to 2 in.; petiole ·5 or ·6 in. *Stipules* shallow cupular, with numerous erect long subulate pubescent teeth ·3 in. in length. *Cymes* axillary sessile, glomerulate, many-flowered, dense, shorter than the petioles, hispidulous-puberulous in all parts. *Flowers* ·15 in. long, on short bracteolate pedicels. *Calyx* with narrow tube and 4 long lanceolate spreading lobes. *Corolla* shorter than the calyx, tubular, with 4 spreading oblong short lobes. *Anthers* 4, oblong, sessile, brown. *Fruit* ovoid, slightly 2-grooved, crowned by the calyx-lobes, less than ·1 in. long, separating into two cartilaginous many-seeded cocci. *Seeds* numerous, angular, brown.

PERAK: *King's Collector* 8728.

A species allied to *H. macrophylla*, Wall., but herbaceous and with narrower leaves, the main-nerves not curved, much narrowed to the base; slightly longer flowers (·15 in. as against ·1 in.) Closely allied also to the Ceylon *H. Thwaitesii*, Hook. fil., but with more acutely angled stems, shorter petioles and smaller less numerous flowers. The calyx-teeth of this are also smaller and narrower and the capsules have numerous seeds.

12. HEDYOTIS CONNATA, Wall. Cat. 856. Herbaceous, glabrous, diffuse, the stems as thick as a crow-quill, terete, wiry, smooth, decumbent near the base and rooting at the nodes, the younger somewhat compressed, grooved and 4-angled when dry. *Leaves* membranous, narrowly oblong to elliptic-oblong, acute or shortly acuminate rather abruptly narrowed at the base to the short petiole; upper surface olivaceous, glabrous; the lower pale, glabrous except the rather bold puberulous midrib; main-nerves 4 or 5 pairs, rather straight, oblique, invisible on the upper surface and faint on the lower; length 1·75 to 2·75; breadth ·35 to ·75 in.; petiole about ·1 in., puberulous. *Stipules* campanulate, the mouth rounded, bearing about 10 spreading erect, filiform scabrid bristles often ·45 in. long. Hook. fil. Fl. Br. Ind. III. 62. *H. merguensis*, Hook. fil. in Gen. Plant. II. 57.

PERAK: *Scortechini*. LANKAWI: *Curtis*.—DISTRIB. Burma.

13. HEDYOTIS AURICULARIA, Linn. Sp. Pl. 101. Herbaceous, diffuse or erect; young branches thicker than a crow-quill, slightly compressed and 4-angled when dry, shortly and softly pubescent. *Leaves* lanceolate or narrowly elliptic-lanceolate, acute or shortly acuminate, the base rather abruptly cuneate; both surfaces olivaceous when dry, the upper sparsely scaberulous-pubescent, the lower paler and more pubescent; both surfaces sometimes glabrous and more or less smooth; main-nerves 4 to 6 pairs, rather straight, obliquely ascending, depressed above and prominent beneath; length 1·5 to 2·25 in.; breadth ·35 to ·85 in.;

petioles .2 to .35 in., pubescent. *Stipules* adnate to the petioles to form a campanulate cup with acuminate 2- or 3-bristled mouth. *Cymes* almost sessile, many-flowered, condensed. *Flowers* nearly sessile, less than .1 in. long. *Calyx* hairy, campanulate, with 4 spreading ovate or lanceolate acute lobes. *Corolla* longer than the calyx, salver-shaped, the lobes narrow. *Fruit* globular-turbinate, crowned by the spreading calyx-lobes, shortly hairy. *Seeds* numerous, dark brown. Prod. IV. 420; Roxb. Fl. Ind. I. 365; ed. Carey & Wall. I. 369; W. & Á. Prod. Fl. Penins. Ind. 412; Hook. fil. Fl. Br. Ind. III. 58. *H. nervosa*, Wall. Cat. 857 (? not of Lam.) *H. procumbens*, Wall. Cat. 861. *H. lineata*, Wall. Cat. 6198 (not of Roxb.) *H. costata*, R. Br. in Wall. Cat. 849; G. Don. Gen. Syst. III. 526. *H. multicaulis*, Schldl. Pl. Hohen. No. 845. *H. venosa*, Korth. in Ned. Kruidk. Arch. II. 160. *Metabolus venosus*, Bl.; DC. Prod. IV. 435. *Spermacoce hispida*, Miq. Pl. Hohen. No. 44. Rheede Hort. Malab. X. t. 32.

PERAK: *Scortechini* 110, 113; *Wray* 3078, 3085; *King's Collector* 88. PAHANG: *Ridley* 1185, 2674. SINGAPORE: *Ridley* 2863. KEDAH: *Ridley* 5547. MALACCA: *Maingay* (K.D.) 891.—DISTRIB. British India; tropical Australia.

14. HEDYOTIS HAVILANDI, n. sp. King. Herbaceous, often rooting at the lower nodes, woody at the base, green when dry; stems thicker than a crow-quill, acutely 4-angled and broadly grooved, deciduously scurfy-hairy especially near the nodes, but afterwards glabrous. *Leaves* membranous, elliptic, tapering to each end, acute, the edges finely undulate when dry; both surfaces, but especially the upper, minutely hispid; main-nerves 3 or 4 pairs, curving upwards, faint on both surfaces (when dry), the midrib pale and prominent on the lower; length 1 to 1.5 in.; breadth .5 to .7 in.; petiole .3 to .5 in. *Stipules* triangular, rather shorter than the cymes, much acuminate and with several long lateral teeth, pilose externally. *Cymes* axillary, sessile, crowded, many-flowered, about .25 in. in diam. *Flowers* .1 in. long, on short hairy pedicels with a few bracteoles between them. *Calyx* pubescent, campanulate; the tube narrow, its mouth with linear-lanceolate acuminate spreading teeth as long as the tube. *Corolla* not much exceeding the calyx-lobes, tubular with 4 broad oblong lobes. *Anthers* oblong, on rather long filaments. *Capsule* narrowly ovoid, crowned by the spreading calyx-lobes, thin-walled, sparsely hispid or glabrous, dehiscent, with several brown seeds in each cell.

PERAK: *Scortechini*; *King's Collector* 10254; *Wray* 4062. PENANG: *Curtis*.—DISTRIB. Burma; Borneo, *Haviland* and *Hose*, 3450 C.

15. HEDYOTIS TENELLIFLORA, Blume Bijdr. 971. Herbaceous, erect, glabrous, a foot or more in height, little-branched. *Stems* and *branches*

about as thick as a crow-quill, when dry dark-coloured, the older subterete, the younger deeply 2-grooved and slightly 4-angled. *Leaves* often in whorls of 4 or 6, coriaceous, sessile, linear, sub-acute, the bases passing into the stipules. *Stipules* cupular, short, the mouth truncate, with about 6 erect flat stout bristles; length 1 to 1.5 in.; breadth .1 to .15 in. *Cymes* very short (under .2 in. long), axillary, crowded. *Flowers* .15 in. long, sessile, surrounded by numerous bracteoles bearing long erect bristles. *Calyx* compressed, obovoid-campanulate, pilose towards the apex; the mouth with 4 lanceolate, acute, spreading, deciduous lobes. *Corolla* slightly exceeding the calyx-lobes, sub-tubular; lobes of the mouth short with thickened apices. *Anthers* broadly ovoid, sessile. DC. Prod. IV. 419; Hook. fil. Fl. Br. Ind. III. 60. *H. angustifolia*, Cham. & Schlect. in Linnæa IV. 153. *H. approximata*, Wall. Cat. 852. ? *Spermacoce tubularis*, Br. in Wall. Cat. 836. *Scleromitron tenelliflorum*, Korth. in Ned. Kruidk. Arch. II, 155. *S. tetraquetrum*, Miq. Fl. Ind. Bot. II. 186. *Oldenlandia angustifolia*, Benth. Fl. Hongk. 151.

PENANG: *Ridley* 7097. PROVINCE WELLESLEY: *Curtis* 2236. MALACCA: *Hervey*.

16. HEDYOTIS NITIDA, W. & A. Prod. Fl. Penins. Ind. 412. Diffuse, sometimes with woody roots; stems about as thick as a crow-quill, 2-grooved, sharply 4-angled, the angles often minutely hispid. *Leaves* coriaceous, sessile, narrowly lanceolate or linear, the edges much recurved, nerves none, but the midrib prominent beneath; the upper surface olivaceous when dry, shining and minutely pitted, quite glabrous; the lower dull pale brown; length .6 to 1 in.; breadth .1 to .25 in. *Stipules* continuous with the bases of the leaves, deeply campanulate, pubescent outside, the mouth bearing 6 to 8 long erect shining bristles. *Inflorescence* axillary, sub-sessile, 2- to 4-flowered. *Flowers* .2 in. long, minutely bracteolate, sessile or on very short pedicels. *Calyx* tubular-campanulate, shortly hispid; the mouth with 4 deep, ovate-acute, ciliate, sub-erect lobes. *Corolla* included in the calyx, pubescent, tubular, its mouth with 4 narrowly ovate sub-acute erect lobes. *Anthers* oblong, sessile. *Capsule* ovoid, crowned by the long erect stiff calyx-lobes, dehiscing by apical valves, sub-glabrous; seeds numerous, brown. Hook. fil. Fl. Br. Ind. III. 61. *H. Neesiana*, Arn. Pugill. 23. *H. glabella*, Br. in Wall. Cat. 886, Bedd. Ic. Pl. t. 36.

PERAK: *Scortechini*; *Wray* 3680. PENANG: *King*.—DISTRIB. British India; Ceylon.

This species, which closely resembles *H. hispida*, Retz., and *H. tenelliflora*, Bl., has not hitherto been recorded from the Malay Peninsula or Islands. The specimens from Penang and Perak have smaller leaves than the majority of those from British India and Ceylon, but otherwise they agree.

17. *HEDYOTIS PINIFOLIA*, Wall. Cat. 850; Hook. fl. Fl. Br. Ind. III. 60. Diffuse, sometimes with a woody root; stems as thick as a crow-quill or thicker, terete when old, angled and grooved when dry, glabrous. *Leaves* sessile, sub-coriaceous, linear, acute, the margins revolute, the bases adnate to the short truncate stipules, puberulous on the upper but glabrous on the lower surface, nerves obscure, midrib distinct; length .5 to 1.5 in.; breadth .05 to .1 in. *Stipules* cupular, glabrous, with a few small bristles on the mouth. *Cymes* axillary and terminal, sessile, 1- to 4-flowered. *Flowers* .1 in. long, on pedicels shorter than themselves. *Calyx* sparsely hispid, ovoid-campanulate, with 4 narrow spreading acute lobes nearly as long as the tube. *Corolla* with a cylindrical tube exceeding the calyx-lobes; its lobes 4, lanceolate, acute. *Stamens* exerted. *Capsule* sparsely pubescent, membranous, broadly ovoid, ridged, crowned by the calyx-teeth, dehiscing by apical valves, several seeded. G. Don Gen. Syst. III. 525; *Scleromitron rigidum*, Kurz in Journ. As. Soc. Beng. 1877 II. 136 (excl. syn. Miq.)

PERAK: *Ridley* 3070, 7203; *Scortechini* 1012. PROVINCE WELLESLEY: *King*. SINGAPORE: *Ridley* 8924, 8925; *Hullett* 564. JOHOR: *Ridley* 11141. PAHANG: *Ridley* 1623. KEDAH: *Curtis*. MALACCA: *Griffith* (K.D.) 2895/2.—DISTRIB. British India.

18. *HEDYOTIS HISPIDA*, Retz Obs. IV. 23. Herbaceous, slightly branched; stems thicker than a crow-quill, sub-terete when old, deeply two-grooved, compressed and 4-angled when young, sparsely and softly pubescent, especially near the nodes. *Leaves* thinly coriaceous, narrowly oblong-lanceolate, acute, the base somewhat narrowed; both surfaces slightly scaberulous, olivaceous-green when dry, and the edges recurved; main-nerves obscure, midrib prominent below; length .8 to 2 in.; breadth .25 to .5 in.; petiole .1 in. or less. *Stipules* adnate to the petiole to form a campanulate pubescent cup with 6 to 8 bristles on its mouth. *Cymes* few-flowered, sessile, axillary. *Flowers* .2 in. long, sessile. *Calyx* campanulate, hispid, its lobes linear, erect, as long as the tube. *Corolla* as long as the calyx-lobes, tubular; its lobes lanceolate, acuminate, hairy. *Capsule* .1 in. long, ovoid, coarsely pubescent, ribbed, crowned by the erect linear calyx-teeth. *Seeds* numerous, dark brown. Roxb. Fl. Ind. I. 364; Wall. Cat. 845; Hook. fl. Fl. Br. Ind. III. 61. *Scleromitron hispidum*, Korth. in Miq. Fl. Ind. Bot. II. 185. *Oldenlandia hispida*, Benth. Fl. Hongk. 150.

PERAK: *Scortechini* 47, 201. PENANG: *Deschamps*; *Curtis* 1847.—DISTRIB. British India.

13. OLDENLANDIA, Linn.

Slender erect or diffuse much-branched herbs. *Leaves* usually

small, stipules acute or bristly. *Flowers* small, often white, in axillary or terminal dichotomous often paniculate cymes, sometimes solitary. *Calyx* obovoid or turbinate; the mouth 4- rarely 5-toothed; the teeth in fruit erect, often distant and sometimes with interposed processes. *Corolla* funnel- or salver-shaped, with a long or short tube, or rotate: its lobes 4, rarely 5, obtuse, valvate. *Ovary* 2-celled; ovules numerous, the placentas attached to the septum; style filiform; stigmas 2, oblong. *Capsule* small, crowned by the calyx-teeth, usually membranous, sub-globular, often compressed, didymous or ridged, loculicidal at the apex, many-seeded, rarely indehiscent. *Seeds* globose or angled, not winged, smooth or pitted; embryo clavate, in fleshy albumen.—**DISTRIB.** Species about 80; tropical and sub-tropical, mostly Asiatic.

- Leaves in one or more whorls near the base of the stem, elliptic, blunt 1. *O. nudicaulis.*
- Leaves scattered along the whole length of the stem:—
 - Flowers in terminal or axillary few-flowered cymes not much longer than the elliptic-oblong sub-acute leaves: ripe capsules about .15 in. in diam. 2. *O. paniculata.*
 - Flowers in terminal or axillary dichotomous lax cymes, the branches and flower-pedicels long and filiform; leaves narrowly oblong-lanceolate, much narrowed to the base and apex: ripe capsules less than .1 in. in diam. 3. *O. dichotoma.*
 - Flowers 2 to 4 on a slender axillary pedicels or solitary on long pedicels; capsule more than .1 in. broad; leaves linear 4. *O. corymbosa.*
 - Flowers solitary in the leaf-axils:—
 - Some of the flowers solitary, always on long slender pedicels; leaves linear 4. *O. corymbosa.*
 - All the flowers solitary and on long slender pedicels, leaves linear 5. *O. Heynei.*
 - All the flowers sessile:—
 - Leaves narrow, many times longer than broad 6. *O. diffusa.*
 - Leaves rotund-ovate to elliptic not much longer than broad 7. *O. trinervia.*

1. OLDENLANDIA NUDICAULIS, Roth Nov. Sp. 95. A small erect glabrous annual, 4 to 6 inches high, drying green; stem very slender, an inch or two long, minutely scurfy-puberulous, bearing several whorls of 3 or 4 thin, sparsely and minutely scaly, elliptic, rather blunt leaves abruptly narrowed at the base and inserted on the stipules by very short broad petioles, and with about 4 pairs of faint ascending main-nerves, from .7 to 1.5 in. long and from .35 to .65 in. broad. *Cymes* long, slender, laxly corymbose, simple or branched, minutely bracteolate, solitary or several together from the apex of the stem, 1.5 to 3.5 in. long (half of the length being peduncle). *Flowers* .15 in. long, on capillary

pedicels .2 to .5 in. long. *Calyx* cylindric or campanulate with small lanceolate acute spreading teeth. *Corolla* much exceeding the calyx, deeply cut into 4 oblong, blunt, nerved lobes. *Stamens* slightly shorter than the corolla; *anthers* linear, $\frac{2}{3}$ as long as the slender filament. *Capsule* turbinate, the top broad, the persistent calyx-teeth small. *Seeds* numerous. Hook. fil. Fl. Br. Ind. III. 70. *O. rotundifolia*, G. Don Syst. III. 530. *O. ovalifolia* and *O. spergulacea*, DC. Prod. IV. 427, 428. *Hedyotis scapigera*, R. Br. in Wall. Cat. 881. *H. nudicaulis*, W. & A. Prod. 416; Bedd. Ic. Pl. Ind. Or. t. 34. *H. ovalifolia* Cav. Ic. 573. *H. rotundifolia*, Ham. in Wall. Cat. 6190 (not of DC.) *H. spergulacea*, Kurz in Journal As. Soc. Beng. 1877, II. 134.

MALACCA: *Griffith* (K.D.) 2898. KEDAH: *Curtis* 2669.—DISTRIB. British India; Java; Philippines.

2. OLDENLANDIA PANICULATA, Linn. Sp. Pl. 1667. Herbaceous, annual, glabrous, drying a pale olivaceous colour, erect or diffuse, much branched; young branches acutely 4-angled, sometimes narrowly winged, about as thick as a crow-quill. *Leaves* membranous, elliptic or elliptic-oblong, sub-acute, narrowed gradually at the base to the short petiole, both surfaces dull when dry, the nerves indistinct; linear with the midrib distinct; length .4 to .75 in.; breadth .2 to .3 in.; petiole .1 to .2 in. *Stipules* short, cupular, truncate, without bristles or with only 1 or 2 in the middle. *Cymes* in the upper axils or terminal, on peduncles as long as or not more than twice as long as the leaves, lax, few-flowered, minutely bracteolate. *Flowers* under .1 in. long, on thin pedicels two or three times longer than themselves. *Calyx* campanulate, with 4 rather distinct narrow teeth. *Corolla* not much exceeding the calyx-teeth. *Capsule* slightly compressed, turbinate, more than .1 in. diam.; crowned by the small spreading calyx-teeth; seeds numerous, black. Burm. Fl. Ind. 38, t. 15, f. 1; DC. Prod. IV. 427; Hook. fil. Fl. Br. Ind. III. 69. *O. alata*, Roxb. Fl. Ind. I. 421 (not of Koenig). *Hedyotis racemosa*, W. & A. Prod. 414; Wight Ic. t. 312; Wall. Cat. 875 (in part). *H. paniculata*, Lam. Encyc. III. 79; Kurz in Journ. As. Soc. Beng. 1877 II. 134. *H. minima*, Heyne, Wall. Cat. 877.

MALACCA: *Griffith* (K.D.) 2902. PERAK: *Scortechini* 1107.—DISTRIB. British India; Malay and Philippine Islands; China; Polynesia.

3. OLDENLANDIA DICHOTOMA, Hook. fil. Fl. Br. Ind. III. 67. Annual, herbaceous, erect, branching; stems glabrous or very sparsely and minutely hispidulous, as thick as a crow-quill, obscurely 4-angled, pale brown when dry. *Leaves* membranous, narrowly oblong-lanceolate, tapering to both ends; upper surface olivaceous, somewhat scaberulous, sparsely and minutely hispidulous; the lower pale, glabrous, nerves invisible, midrib broad and distinct on the lower surface; length .75 to

1.25 in.; breadth .1 to .2 in.; petiole .05 in. to 0. *Stipules* cupular, very short, with small obscure teeth not bristly. *Cymes* axillary and terminal, with many long slender dichotomous few-flowered, angular, sub-hispidulous branches; the lateral cymes 1 to 2 in. long, the terminal one 3 to 5 in., with leaf-like linear bracts varying from .25 to .5 in. in length. *Flowers* .2 in. long, clavate in bud, solitary at the ends of the ultimate hair-like branchlets. *Calyx* campanulate; the lobes 4, lanceolate, sub-erect, sub-glabrous, often with smaller lobes interposed. *Corolla* twice as long as the calyx, funnel-shaped, the tube long and narrow; the limb wide, with 4 spreading lanceolate teeth, glabrous. *Capsules* less than .1 in. in diam., sub-globular, crowned by the small distant erect calyx-teeth, glabrous, dehiscent. *Seeds* numerous, brown. *Hedyotis dichotoma*, Koen. ex Roth Nov. Sp. 93; Wall. Cat. 6204 (*in part*); W. & A. Prod. 416 (*excl. some synonyms*). *H. affinis*, Roem. & Sch. Syst. 194. *H. Heynei*, Bedd. Ic. Pl. In. Or. t. 33 (not of Brown). *H. brachiata*, Wall. Cat. 6201 (*in part*) not of Wight.

PENANG: *King's Collector* 1282; *Curtis* 494; *Deschamps*. PROVINCE WELLESLEY: *King*. MALACCA: *Ridley* 1717. JOHOR: *Ridley* 11146.

4. OLDENLANDIA CORYMBOSA, Linn. Sp. Pl. 119. Rather stouter and more branched than *O. dichotoma*, and the branches more boldly angled. *Leaves* usually rather shorter, many of them not exceeding .5 in. in length. *Flowers* solitary, on pedicels not more than half as long as in *O. dichotoma*, or in pedunculate 3- to 4-flowered corymbs, otherwise as in *O. dichotoma*. Hiern *Flora Trop. Afric.* III. 62; Hook. fil. *Fl. Br. Ind.* III. 64; *Trim. Fl. Cey.* I. 314. *O. biflora*, Lam. *Encyc.* IV. 533 (*not of Linn.*); Roxb. *Fl. Ind.* I. 423. *O. ramosa*, Roxb. l. c. 424. *O. herbacea*, DC. *Prod.* IV. 425 (*not of Linn.*) *O. scabrida*, DC. l. c. *Hedyotis Burmaniana*, Br. in Wall. Cat. 868 *in part*; W. & A. *Prod. Fl. Pen. Ind.* 415. *H. biflora*, Roth Nov. Spec. 92; Kurz in *Journ. As. Soc. Beng.* 1877, II. 133. *H. ramosa*, Bl. *Bijdr.* 973; ? Wight *Ic. t.* 822. *H. intermedia*, W. & A. *Prod.* 415. *H. alsinæfolia*, Br. in Wall. Cat. 873. *H. graminicola*, Kurz in *Timen's Journ. Bot.* 1875, 326. *Gerontogea biflora*, Cham. & Schl. in *Linnæa.* IV. 155.—Rheede *Hort. Mal.* x. t. 38.

JOHOR: *Ridley* 2861, 11142. SINGAPORE: *King's Collector* 27; *Ridley*. PENANG: *Curtis* 494, 1849, 1988. PROVINCE WELLESLEY: *King*. ANDAMANS: *King's Collector*.—DISTRIB. British India; Malay Archipelago; tropical Africa and America.

5. OLDENLANDIA HEYNEI, G. Don Gen. Syst. III. 531. Stouter and taller than *O. dichotoma* and drying (especially as regards the under surfaces of the leaves) of a darker colour, and the stems more boldly 4-angular; the *flowers* solitary but on equally long pedicels as in *O. dichotoma*, the capsules slightly larger and wider at the base. Hook. fil.

Fl. Br. Ind. III. 65. *O. herbacea*, Roxb. Fl. Ind. I. 424. *O. linearis*, *O. linifolia* and *O. asperula*, DC. Prod. IV. 425. *Hedyotis Heynii*, W. & A. Prod. 416; Wall. Cat. 867 (*in part*).

PENANG: *Curtis* 1848, 3399; *King*; *Deschamps*. PROVINCE WELLESLEY: *King*. PERAK: *Ridley* 10313; *Wray* 1931. SINGAPORE: *Ridley* 10916.—DISTRIB. Malay Archipelago; Tropical Africa.

This passes into *O. dichotoma* as regards its inflorescence there being some specimens in which, by reason of the smallness of the leaves, the inflorescence resembles a lax panicle.

6. OLDENLANDIA DIFFUSA, Roxb. Hort. Beng. 11; Fl. Ind. I. 423. Annual, diffuse, much-branched, dark brown when dry; glabrous. *Stems* about as thick as a crow-quill when dry, compressed, obscurely 4-angled, striate. *Leaves* linear-oblong, tapering to each end, the bases continuous with the stipules, the edges recurved, rather pale on the undersurface and the midrib prominent; length .5 to 1.5 in.; breadth .05 to .1 in. *Stipules* cupular, the edges with a few short bristles towards the middle. *Flowers* .15 in. long, solitary, axillary, sub-sessile or on peduncles .05 to .1 in. long, reflexed. *Calyx* widely campanulate, with 4 erect triangular acute 1-nerved teeth. *Corolla* longer than the calyx, widely campanulate, the mouth with 4 erect rather short broad triangular teeth. *Anthers* shorter than the style, small, narrowly ovoid; filaments rather short. *Stigma* with 2 divergent lobes. *Capsule* depressed globular, crowned by the small calyx-teeth, slightly more than .1 in. in diam., many-seeded. DC. Prod. IV. 426; Hook. fil. Fl. Br. Ind. III. 64; Trim. Fl. Ceyl. II. 315. *O. brachypoda*, DC. l.c. 424; Wall. Cat. 874. *Hedyotis ramosissima*, Kurz in Journ. As. Soc. 1877 II. 133. *H. diffusa*, Willd. Sp. Pl. I. 566; Wall. Cat. 868 (*in part*). *H. extensa*, Wall. Cat. 869. *H. polygonoides*, Wall. Cat. 872.

In all the provinces except the Andamans; common.—DISTRIB. Tropical Asia; Japan.

7. OLDENLANDIA TRINERVIA, Retz Obs. IV. 23. Annual, herbaceous, glabrous or hairy, procumbent, greenish brown when dry. *Stems* very slender, grooved, 4-angled, sparsely hairy, often rooting at the nodes. *Leaves* ovate-rotund to rotund or elliptic, thickly membranous, midrib distinct below but the 1 or 2 pairs of nerves obscure, both surfaces glabrous or sub-glabrous; length .2 to .3 in.; breadth under .05 or over; petiole usually under .05 in. long. *Stipules* scarious, campanulate with a few bristles. *Flowers* .05 in. long, solitary, axillary, on short reflexed pedicels. *Calyx* campanulate, with 4 acute spreading teeth, sparsely pilose. *Corolla* slightly exceeding the calyx, with 4 broad, ovate, sub-acute lobes, glabrous. *Capsules* somewhat compressed, broadly ovate, truncate at the apex, crowned by the small calyx-lobes, dehiscent at

the apex; *seeds* numerous, angled, black. Hook. fil. Fl. Br. Ind. III. 66; Trim. Flora Ceylon III. 316. *O. repens*, Burm. Fl. Ind. t. 15, f. 2? *Hedyotis trinervia*, W. & A. Prod. 414; Dalz. & Gibs. Fl. Bomb. 115; Bedd. Ic. Pl. Ind. Or. t. 29. *H. rotundifolia*, DC. Prod. IV. 420. *H. serphyllifolia*, Poir. in DC. l.c. 421. *H. orbiculata*, Heyne, Wall. Cat. 6191.

SINGAPORE: *Ridley* 8047. PAHANG: *Ridley* 1492. PENANG: *Curtis* 1844.—DISTRIB. British India; Sumatra; Java; ; Borneo; Philippines; Ceylon; Tropical Africa.

14. OPHIORRHIZA, Linn.

Decumbent creeping or erect herbs (rarely under-shrubs), with slender terete branches. *Leaves* usually elliptic-lanceolate, often unequal; *stipules* caducous, very often small. *Flowers* rather small, white, pink or greenish, secund in dichotomously branched axillary or terminal cymes; bracts and bracteoles various or absent. *Calyx* short, usually cylindric or campanulate, becoming obreniform or obcordate in fruit, the lobes small and persistent. *Corolla* tubular or funnel-shaped, the tube inside glabrous or hairy; the lobes 5, short, valvate in bud, often winged on the back, and with a fold in the sinus between neighbouring lobes. *Stamens* 5, inserted on the tube; *anthers* linear. *Disk* large, fleshy, 2-lobed. *Ovary* 2-celled; style filiform; stigmas 2, linear or broad; *ovules* numerous, inserted on placentas ascending from the bases of the cells. *Capsules* coriaceous, compressed obreniform or obcordate, dehiscing at the apex by 2 broad gaping valves; placentas divaricating, many-seeded. *Seeds* minute, angled, the testa crustaceous; embryo clavate, in fleshy albumen.—DISTRIB. Species about 50, tropical Asiatic.

Leaves quite glabrous:—

- | | | | | | |
|---|-----|-----|-----|-----|--------------------------|
| Stipules lanceolate; leaves elliptic or elliptic-oblong, 1 to 1.5 in. broad | ... | ... | ... | ... | 1. <i>O. discolor.</i> |
| Stipules reduced to rugulose bands; leaves elliptic, 1.5 to 4 in. broad | ... | ... | ... | ... | 2. <i>O. erubescens.</i> |

Leaves glabrous except their nerves:—

- | | | | | | |
|--|-----|-----|-----|-----|---------------------------|
| Larger leaves 5 or 6 in. long and 1.5 to 2 in. broad, midrib nerves and reticulations puberulous | ... | ... | ... | ... | 3. <i>O. fasciculata.</i> |
| Larger leaves 2 to 3 in. long and .65 to 1 in. broad; nerves and midrib beneath with dense pale pubescence | ... | ... | ... | ... | 4. <i>O. hispidula.</i> |

Leaves glabrous on the upper surface, glabrous or puberulous and usually stained with red on the lower when dry, elliptic or oblong-elliptic, 2 to 5 in. long and 1 or 2 in. broad

- | | | | | | |
|-----|-----|-----|-----|-----|----------------------|
| ... | ... | ... | ... | ... | 5. <i>O. Mungos.</i> |
|-----|-----|-----|-----|-----|----------------------|

Leaves slightly puberulous:—

Stipules forming a broadly triangular very shallow cup,

- the mouth sub-truncate; leaves puberulous above on and near the edges and on midrib; '5 to '75 in. broad ... 6. *O. Harrisiana*
var. *argentea*.
- Stipules forming a short cup with its mouth obscurely toothed; leaves minutely puberulous on midrib and nerves beneath, '5 to 1 in. broad 7. *O. tenella*.
- Stipules lanceolate with long filiform points; larger leaves 3 or 4 in. long and '75 to 1'25 in. broad, glabrous but for a few scattered thick hairs 8. *O. rugosa*.
- Leaves hairy everywhere on both surfaces:—
- Larger leaves 2'5 to 4 in. long, both surfaces with white hispidulous hairs, narrowly elliptic, '75 to 1'25 in. broad... 9. *O. tomentosa*.
- Leaves elliptic or ovate-elliptic, 3'5 to 5 in. long and 1'75 to 2'5 in. broad, sparsely strigose above, hispidulous beneath 10. *O. Kunstleri*.

1. OPHIORHIZA DISCOLOR, R. Br. in Wall. Cat. 6232 A. *Stem* erect, woody in its lower part, dark-coloured, terete, glabrous. *Leaves* of the pairs unequal, but not greatly so, membranous, narrowly elliptic or elliptic-oblong, much acuminate and narrowed from below the base to the long rather slender petiole; both surfaces quite glabrous; the upper dark brown, slightly tinged with purple; the lower pale minutely reticulate and much tinged with purple; main-nerves 7 to 12 pairs, curved, spreading, faint on the upper surface and but little prominent on the lower; length 2'5 to 4'5 in.; breadth 1 to 1'5 in.; petioles '35 to 1 in. *Stipules* linear-lanceolate, '1 to '2 in. long, deciduous. *Cymes* solitary, terminal, an inch or two in length; few-branched, ebracteolate; the peduncle and branches minutely puberulous. *Flowers* '25 in. long, second in a single row, on very short pedicels which lengthen in fruit. *Calyx* narrowly campanulate; the teeth short, broad, boldly 1-nerved. *Corolla* clavate in bud, '2 in. long; tube cylindric, slightly inflated in the upper half; the teeth shorter than the tube, obtuse, erect. *Capsule* narrowly obreniform, the sinus almost obsolete, glabrous, '3 in. across. G. Don Gen. Syst. Bot. III. 522; Hook. fl. Br. Ind. III. 79. *O. villosa*, Wall. Cat. 6230 (*not of Roxb.*)

JOHOR: Ridley. PENANG: Deschamps.

2. OPHIORHIZA ERUBESCENS, Wall. Cat. 6233. Glabrous except the puberulous inflorescence; stem 1 to 3 feet high, woody, as thick as a goose-quill, the bark whitish, striate, corky. *Leaves* of each pair subequal, thinly membranous, elliptic-lanceolate, elliptic-oblancoate or narrowly elliptic, somewhat oblique, acuminate, the base much narrowed; upper surface greenish when dry, the midrib prominent but the nerves faint; lower surface pale greenish-white, reticulate, the 10 to 14 pairs of rather straight spreading main-nerves rather flat and prominent like the midrib; length 4 to 9 in.; breadth 1'5 to 4 in.;

petioles .35 to 1.2 in.; *stipules* (dried specimens) reduced to rugulose transverse bands. *Cymes* terminal, solitary, pedunculate, in flower much shorter than, but in fruit half as long as, the leaves or even more; the branches divaricate, slender, many-flowered, in fruit often as much as 2.5 in. long. *Flowers* .35 in. long, secund, on short puberulous pedicels, very narrow in bud. *Calyx* cylindric, .05 in. long; its teeth broadly triangular, sub-acute, 1-nerved. *Corolla* .3 in. long, narrowly cylindric; the mouth with 5 short blunt reflexed teeth. *Anthers* 5, linear, cordate at the base. *Capsules* narrowly rhomboid, the upper edge marginate, glabrous, .3 in. across. Hook. fil. Fl. Br. Ind. III. 84 as a doubtful species.

PERAK: *Scortechini* 1313; *Wray* 3731, 4050; *King's Collector* 2187, 7119, 5853, 7186, 7119; *Curtis*.—DISTRIB. Burma.

3. OPHIORHIZA FASCICULATA, Don Prod. Fl. Nep. 136. Stem 10 to 14 in. high, erect, little-branched, woody, and nearly as thick as a goose-quill below, puberulous. *Leaves* of a pair very unequal in size, membranous, narrowly elliptic or oblong-elliptic, sub-acute, the base cuneate; upper surface very dark olivaceous when dry, glabrous, the nerves and midrib pale and prominent; lower surface pale yellowish-brown, puberulous on the midrib and 9 to 11 pairs of boldly curved spreading dark-coloured main-nerves; the reticulations also puberulous, their interspaces glabrous; length of the larger leaves 5 or 6 in.; breadth 1.5 to 2 in.; the smaller leaves of the pairs .8 to 2.5 in. long and .85 to 1.5 in. broad; petioles .2 to .8 in. long. *Stipules* .15 in. long, subulate with dilated bases. *Cymes* usually solitary, but sometimes 2 or 3 together, terminal, pedunculate, usually less than half as long as the leaves even when in fruit, puberulous everywhere, ebracteate; branches shorter than the peduncles. *Flowers* small (rather less than .25 in. long), on short puberulous pedicels. *Calyx* narrowly campanulate, densely puberulous, boldly ribbed; the teeth shorter than the tube, triangular, acute, erect. *Corolla* .2 in. long, cylindric, inflated in the lower part and expanded at the mouth; the 5 lobes short, blunt. *Anthers* narrowly linear, on short filaments. *Capsules* obreniform, the sinus shallow, glabrous, .25 in. across. Hook. fil. Fl. Br. Ind. III. 83. *O. bracteolata*, R. Br. in. Wall. Cat. 6228.

PERAK: *King's Collector* 2205; *Wray* 1989.—DISTRIB. Himalaya and Khasia.

4. OPHIORHIZA HISPIDULA, Wall. Cat. 6234. Erect, little-branched, slender, pubescent, thicker than a crow-quill. *Leaves* of the pair unequal, membranous, ovate-lanceolate, sub-acute, cuneate (sometimes abruptly so) at the base; upper surface (when dry) olivaceous, glabrous, the midrib prominent but the nerves rather obscure; lower surface pale olivaceous, otherwise sub-glabrous but the bold midrib and 6 or 7 pairs

of spreading main-nerves covered with minute dense white pubescence; length $\cdot 75$ to 2 in.; breadth $\cdot 4$ to 1 in.; petioles $\cdot 15$ to $\cdot 6$ in. *Stipules* narrowly linear-lanceolate from broad bases, $\cdot 1$ to $\cdot 2$ in. long. *Cymes* terminal, solitary, pedunculate, shorter than the leaves, ebracteate, everywhere shortly pubescent; branches few, shorter than the peduncles. *Flowers* $\cdot 25$ in. long, few but crowded, sessile or on short pedicels. *Calyx* rather under $\cdot 1$ in. long, cylindric, with 5 narrow erect teeth shorter than the tube, puberulous outside like the corolla. *Corolla* cylindric, somewhat inflated in the lower half; the mouth with 5 narrowly oblong sub-acute erect short lobes. *Capsules* obreniform with a shallow sinus, shortly and coarsely pubescent, $\cdot 2$ in. across. *O. trichocarpa*, Hook. fil. Fl. Br. Ind. III. 78 (not of Blume).

PAHANG: *Ridley* 2199, 2200; *Yapp* 536.

5. OPHIORHIZA MUNGOS, Linn. Sp. Pl. 150. Glabrous in all its parts, or puberulous on the stems, under surfaces of the leaves, and on the inflorescence. *Stems* from a few inches to a foot and a half high, erect, little branched, thicker than a crow-quill, woody near the base. *Leaves* membranous, one of each pair slightly larger than the other, elliptic or oblong-elliptic, the apex shortly acuminate, the base narrowed and sometimes slightly oblique; upper surface always glabrous and shining, when young dark green, when dry dark-brown, the nerves indistinct; lower surface glabrous or puberulous, when fresh whitish beneath and the nerves red, when dry reddish, and the nerves dark; main-nerves 7 to 15 pairs, curved, spreading; length 2 to 5 in.; breadth $\cdot 7$ to $2\cdot 25$ in.; petioles $\cdot 3$ to 1 in. *Stipules* linear or subulate from broad bases, $\cdot 15$ to $\cdot 2$ in. long, fugacious. *Cymes* terminal, much shorter than the leaves, with spreading branches 1 to 3 in. in diam., ebracteolate, glabrous or puberulous, the peduncles $\cdot 35$ to $1\cdot 5$ in. long. *Flowers* on short pedicels, sub-secund, glabrous or puberulous, $\cdot 6$ in. long. *Calyx* rather more than $\cdot 1$ in. long, wide, cylindric with 5 acute triangular dorsally ridged erect teeth. *Corolla* four times as long as the calyx, cylindric, widening somewhat towards the 5 short broad blunt lobes of the mouth. *Capsule* narrowly obreniform, $\cdot 25$ in. across, glabrous or pubescent, prominently 5-ridged. *Seeds* numerous, small, brown. Gaertn. Fruct. I. t. 55; Roxb. Fl. Ind. I. 701; W. & A. Prod. Fl. Pen. Ind. 404; Hook. fil. Fl. Br. Ind. III. 77.

In all the provinces, common and variable in size and pubescence.—
DISTRIB. British India; Ceylon; Sumatra; Java.

6. OPHIORHIZA HARRISIANA, Heyne, var. ARGENTEA, Hook. fil. Fl. Br. Ind. III. 78. *Stems* woody below, 6 to 18 in. high, branching, terete, glabrous, dark-coloured when dry. *Leaves* unequal, membranous, narrowly oblong-lanceolate, much tapered to each end, the base narrow

and somewhat oblique; upper surface dark olivaceous-brown when dry, sparsely puberulous or glabrous, the main-nerves obscure; the lower pale (glaucous), pinkish, glabrous except for a few scattered hairs on the prominent midrib and 6 to 10 pairs of oblique slightly curved dark-coloured broad main-nerves; length 1·5 to 3·5 in.; breadth ·65 to ·85 in.; petioles ·15 to ·5 in. *Stipules* lanceolate or oblong, ·25 in. long. *Cymes* terminal, solitary or several together on the apices of the branches and stem, shorter than the leaves, the branches shorter than the peduncle, puberulous. *Flowers* ·35 in. long, sessile or on short pedicels, secund. *Calyx* ·1 in. long, cylindric, with 5 erect triangular acute teeth much shorter than the tube. *Corolla* ·3 in. long, puberulous externally like the calyx, cylindric, slightly widened near at the apex; lobes 5, short, broad, 1-nerved. *Capsules* obreniform with very shallow sinus, glabrous, ·15 to ·25 in. across. *O. argentea*, Wall. Cat. 6229.

PERAK: *Scortechini* 432 (in part) 634; *Wray* 1984, 3647; *Curtis* 3147; *Yapp* 539. PAHANG: *Ridley* 2202. SELANGOR: *Kelsall* 1989.—
DISTRIB. Khasia Hills.

7. OPHIORHIZA TENELLA, King n. sp. Erect or decumbent, 6 to 12 in. high. *Stem* slender, much branched, covered with minute yellowish pubescence. *Leaves* membranous, those in a pair sub-equal, elliptic-ovate to ovate-lanceolate, sub-acute, sometimes rounded but usually rather abruptly narrowed at the base; upper surface olivaceous when dry, glabrous except for a very few scattered short thick hairs; lower surface pale greenish-yellow, minutely puberulous on the broad midrib and 6 to 8 pairs of spreading rather straight main-nerves; length 1 to 2 in.; breadth ·5 to 1 in.; petiole ·1 to ·25 in., puberulous. *Stipules* short, cupular, obscurely toothed, less than ·1 in. deep. *Cymes* solitary, terminal, few-flowered, pedunculate, shorter than the leaves. *Flowers* ·3 in. long, almost sessile. *Calyx* less than ·1 in. long, cylindric with 5 lanceolate spreading 1-nerved lobes shorter than the tube, covered with short coarse hair. *Corolla* ·25 in. long, funnel-shaped; the tube slightly dilated near the base; the 5 lobes ovate-lanceolate, sub-acute, spreading, sub-reflexed. *Capsule* narrowly obreniform, sub-glabrous, ·25 in. across.

PERAK: *King's Collector* 499, 546. PAHANG: *Ridley* 2201.—DISTRIB. Burma.

8. OPHIORHIZA RUGOSA, Wall. Cat. 6235. Herbaceous, sub-erect, 4 to 6 in. high, the stem unbranched, thicker than a crow-quill, tomentose. *Leaves* unequal, membranous, oblong-oblanceolate, or oblong, sub-acute, or shortly and bluntly acuminate, the base narrowed; upper surface dark olivaceous when dry, glabrous or with few scattered short thick hairs, the nerves and midrib inconspicuous; lower surface pale olivaceous, with coarse short pubescence on the midrib, reticulations and 12 to

14 pairs of thick curved spreading nerves; length 1 to 3·5 in.; breadth ·5 to 1·25 in.; petioles ·2 to ·4 in., pubescent. *Stipules* narrowly linear-lanceolate from a broad base, ·2 in. long. *Cymes* solitary, terminal or from the upper axils, pedunculate, shorter than the leaves; branches few, short, in dichotomous umbels an inch or less across; peduncles pubescent like the branches. *Flowers* less than ·05 in. long (? cleistogamic) in groups of 3 or 4 enveloped in oblong blunt, pubescent bracts longer than themselves. *Calyx* cylindrical, 5-toothed. *Corolla* slightly exceeding the calyx, cylindrical, 5-toothed. *Anthers* 5, oblong, short, included. *Capsules* oblong-reniform with shallow sinus, pubescent, ·2 in. across. *O. Harrisiana*, Heyne, var. *rugosa*, Hook. fil. Fl. Br. Ind. III. 78.

PERAK: at 3900 feet, Wray 1482.—DISTRIB. Nepal and Sikkim Himalaya.

9. OPHIORHIZA TOMENTOSA, Jack in Roxb. Fl. Ind. ed Carey & Wall. II. 546. Erect, 8 to 12 in. high; stem woody near the base, thinner than a goose-quill, sparsely clothed with flexuose hairs. *Leaves* membranous, the two of a pair unequal in size, narrowly elliptic to elliptic-oblong, acute, the base narrowed, slightly oblique; upper surface olivaceous-green when dry, with sparse curved white stiff hairs; the lower pale, with numerous white hispidulous hairs between the main-nerves, the hairs on the broad prominent midrib and 8 to 12 pairs of curved spreading main-nerves brown; length 1·75 to 3·75 in.; breadth ·75 to 1·25 in.; petioles ·2 to ·8 in., stout, pubescent. *Stipules* linear, curved, about ·1 in. long, deciduous. *Cymes* terminal, solitary, pedunculate; shorter than the leaves, few-branched; peduncles 1 to 2 in. long, pubescent. *Flowers* ·25 in. long, on pubescent pedicels shorter than themselves. *Calyx* tubular, about ·05 in. long, obscurely toothed. *Corolla* salver-shaped; the tube narrow, the lobes blunt. *Capsules* obreniform, puberulous, rather less than ·2 in. across. Wall. Cat. 6231; Hook. fil. Fl. Br. Ind. III. 79; Miq. Fl. Ind. Bat. II. 174.

PENANG: King; Curtis 907; King's Collector 1314. PERAK: King's Collector 4846; Curtis 3257.

10. OPHIORHIZA KUNSTLERI, King n. sp. Stem erect, woody at the base, not branched, about a foot high, dark-coloured, deciduously rusty-puberulous. *Leaves* membranous, sub-equal, elliptic or ovate-elliptic, shortly and abruptly acuminate, the base rounded or slightly cuneate; upper surface dark-brown, sparsely strigose, the midrib distinct but the main-nerves faint; lower pale yellowish-brown, hispidulous chiefly on the stout prominent midrib and 10 to 14 pairs of spreading slightly curved rather bold nerves; the edges minutely ciliate; length 3·5 to 5 in.; breadth 1·75 to 2·5 in.; petioles ·5 to 1·75 in., bearing a few scattered hairs. *Stipules* lanceolate, acuminate, ·2 in. long, hairy,

deciduous. *Cymes* solitary in the axils of the upper leaves or terminal; pedunculate, much shorter (peduncle included) than the leaves when in flower and rather more than half as long in fruit, everywhere rusty-pubescent, the branches few, obliquely umbellate. *Flowers* numerous, in two second rows on the branches, rather more than $\frac{1}{2}$ in. long, on short hirsute pedicels, and intermixed with lanceolate hirsute or ciliate bracteoles. *Calyx* campanulate, with truncate entire mouth. *Corolla* scarcely longer than the calyx, widely cylindric. *Anthers* 5, oblong, versatile, dorsified. *Capsule* obreniform, the sinus large, rusty-pubescent, $\frac{2}{3}$ in. across.

PERAK: *King's Collector* 8247.

A species allied to *O. tomentosa*, Jack. var. *glabrata* and *O. trichocarpa*, Bl., but the leaves of this are larger and much broader and the hairs on them are larger and more yellow in colour.

15. LUCINAEA, DC.

Erect shrubs or epiphytic climbers, glabrous or nearly so. *Leaves* usually coriaceous. *Flowers* in axillary or terminal, solitary or paniced, pedunculate heads. *Calyx-tube* turbinate; the limb annular or cupular, entire, persistent. *Corolla* funnel-shaped, white; the tube densely pilose inside; the limb coriaceous, with 4 or 5 oblong-lanceolate valvate lobes. *Stamens* 4 or 5, inserted in the tube on short villous filaments or sessile; *anthers* dorsifixed, linear-oblong, included. *Ovary* 2-celled; *style* filiform or thickened below the middle; *stigmas* 2, linear or spatulate; *ovules* numerous, on fleshy peltate placentas. *Fruits* baccate, surmounted by the truncate calyx-limb, sub-confluent. *Seeds* compressed; the testa smooth, coriaceous; embryo minute, in fleshy albumen.—DISTRIB. Species about 18, all Malayan.

Flower heads in a terminal panicle 1. *L. paniculata*.

Flower heads solitary or in fascicles of three:—

All parts quite glabrous; corolla $\frac{7}{8}$ in. long 2. *L. Ridleyi*.

Young branches and inflorescence pubescent:—

Leaves membranous, much narrowed at the base;

flowers 5-merous 3. *L. membranacea*.

Leaves coriaceous, with broad rounded bases, flowers

4-merous 4. *L. Morinda*.

1. LUCINAEA PANICULATA, King n. sp. Glabrous; young branches thinner than a goose-quill, glabrous, brown when dry. *Leaves* oblanceolate to elliptic, shortly and rather abruptly acuminate, the base narrowed to the rather stout petiole; both surfaces glabrous, brown when dry, the lower paler and with the reticulations visible; midrib strong on both surfaces; main-nerve about 10 pairs, spreading slightly ascending and little curved; length 6 to 10 in.; breadth $2\frac{1}{4}$ to $4\frac{1}{4}$ in.; petioles

·8 to 1·5 in.; stipules ovate-lanceolate, vaginate in the lower half, ·4 to ·8 in. long. *Heads* in a pedunculate terminal panicle 5 or 6 in. long, its branches about half an inch to one inch long, thick, each bearing at its apex a head of three or four sessile flowers confluent by their bases; the common peduncle of the panicle with a sheathing basal bract ·5 in. long. *Calyx* truncate. *Fruit* unknown.

PERAK: *Scortechini*; *King's Collector* 2164.

2. LUCINAEA RIDLEYI, King n. sp. Epiphytal; young branches thinner than a goose-quill, terete, glabrous, dark-brown when dry. *Leaves* thinly coriaceous, quite glabrous, obovoid-oblong to narrowly elliptic, acute or shortly and abruptly acuminate, much narrowed at the base; upper surface brown when dry, the lower paler minutely punctate, reticulate; main-nerve 6 to 8 pairs, spreading, faint, the intermediate almost as prominent, the midrib bold; length 4 to 6 in.; breadth 1·5 to 2·5 in.; petioles ·75 to 1 in. *Stipules* lanceolate, oblong, sub-acute, connate and cartilaginous at the base, ·5 to ·75 in. long. *Peduncle* solitary, terminal, about ·1 in. long, each bearing a dense head about 1 in. in diam. (when dry), consisting of 8 to 12 sessile flowers. *Calyx* sub-quadrangular, the limb truncate. *Corolla* ·75 in. long, thick, ovate-oblong in bud, the narrowly oblong lobes as long as the tube. *Fruit* ·4 to ·6 in. long, crowned by the wide truncate calyx-limb.

SINGAPORE: *Lobb*. PERAK: *Scortechini* 306, 639; *Wray* 446; *Ridley* 2923; *King's Collector* 2162, 5052, 7836.—DISTRIB. Borneo, *Beccari* 3505.

3. LUCINAEA MEMBRANACEA, King n. sp. An epiphytic woody shrub; young branches terete, thinner than a goose-quill, covered with a dense coat of minute rusty deciduous pubescence. *Leaves* membranous, oblong-elliptic or narrowly elliptic, acute or shortly acuminate, narrowed (rarely rounded) at the base, upper surface quite glabrous, brown when dry; the lower paler, puberulous on the midrib; main-nerve 8 or 9 pairs, faint, spreading; length 3·5 to 5 in.; breadth 1·25 to 2·25 in.; petioles ·1 to ·15 in.; stipules broadly ovate, carinate, pubescent, and vaginate near the base, ·5 to ·75 in. long. *Peduncles* unequal, terminal or in fascicles of 2 or 3, the longer 1 in. long, the shorter as little as ·2 in. long, all dilated at the apex and pubescent, and each bearing a head about ·75 in. in diam. consisting of 8 to 10 sessile flowers. *Calyx*-limb truncate. *Corolla* thick; the tube cylindrical, ·15 in. long, hairy inside in its upper half; the limb with 5 lanceolate reflexed glabrous lobes shorter than the tube, the tips of the lobes incurved; *anthers* 5, sessile, linear. *Style* exerted, hairy in the upper half. *Fruits* subglobular, confluent at the base, ·15 in. in diam.

PERAK: *Scortechini* 283; *Curtis* 2016; *Ridley* 5543; *Wray* 832, 177,

3998; *Scortechini* 47, 283, 603; *King's Collector* 762, 10152.—DISTRIB. Borneo.

Allied to *L. Morinda*, DC., but the leaves of that species are more coriaceous, have more main-nerves and broader bases. The flowers moreover of this are 5-merous and of that 4-merous.

4. LUCINAEA MORINDA, DC. Prod. IV. 368. Young branches thinner than a goose-quill, puberulous but ultimately glabrous. *Leaves* coriaceous, glabrous, lanceolate to elliptic-oblong, rarely somewhat obovate, brown when dry; apex acute or sub-acute, the base rounded or minutely cordate; main-nerves 8 to 12 pairs, faint, spreading, slightly curved; length 1·5 to 2·5 in.; breadth ·9 to 1·25 in.; petiole ·15 to ·25 in., slender; *stipules* triangular. *Peduncles* solitary or in fascicles of three, usually terminal but sometimes axillary, pubescent, about 1 in. long. *Heads* ·75 in. in diam., 8- to 10-flowered. *Calyx* with a short truncate limb. *Corolla* ·2 in. long, sessile. *Berries* crowded, broadly turbinate, glabrous. Wall. Cat. 8437. *Morinda polysperma*, Jack. in Mal. Misc. I. 14; Roxb. Fl. Ind. ed. Carey & Wall. II. 204; Hook. fl. Fl. Br. Ind. III. 93.

MALACCA: *Griffith* (K.D.) 2954; *Ridley* 1598; *Maingay* (K.D.) 875. PENANG: *Wallich* 8437. PERAK: *Curtis* 1337. SELANGOR: *Ridley* 3819. PAHANG: *Ridley* 1093. PERAK: *Scortechini* 283; *Wray* 2405, 4211; *King's Collector* 4645, 5498, 8482. SINGAPORE: *Jack*.—DISTRIB. Malay Archipelago. Always littoral.

16. LECANANTHUS, Jack.

A small glabrous shrub. *Flowers* crowded in involucrate axillary, sessile or pedunculate, nodding heads. *Calyx-tube* ovoid or turbinate; the limb oblique, campanulate, with 2 to 4 short obtuse unequal lobes, or 2-lipped, persistent. *Corolla* funnel-shaped; the tube inflated below; the limb with 5 thick obtuse bearded lobes, valvate in bud. *Stamens* 5, inserted by short filaments in the throat of the corolla; *anthers* bifid below. *Disk* urn-shaped. *Ovary* 2-celled; style slender, with 2 linear or oblong stigmas; ovules numerous; placentas spongy, attached to the septum. *Fruit* membranous, 2-celled, pulpy, many-seeded, placentas thick. *Seeds* obtusely angled, the testa smooth, thick; embryo small, in fleshy albumen.—A single species.

LECANANTHUS ERUBESCENS Jack in Mal. Misc. II. 83. Glabrous everywhere except the calyx. *Stem* with 4 angles, two of them acute, 12 to 18 in. high. *Leaves* thickly membranous, ovate-elliptic to narrowly oblong, shortly acuminate, tapering below to the short petiole; main-nerves about 7 pairs, curved, ascending, faint, the veins distinct; length 3 to 8 in.; breadth 1·25 to 3 in. *Stipules* ovate-lanceolate, acuminate,

3 or 4 in. long. *Heads* sub-globular, .75 to 1 in. in diam. (when dry). *Flowers* sessile, pale red. *Calyx* coloured, pubescent, wider than the corolla, those of the outer flowers 2-lipped and imbricate. Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 319; Wall. Cat. 6224; DC. Prod. IV. 620; Miq. Fl. Ind. Bat. II. 153, 199; Ann. Mus. Lugd. Bat. IV. 132; Hook. fil. Fl. Br. Ind. III. 100. *Lecananthus* sp. Griff. Notul. IV. 272.

SINGAPORE: *Wallich, Lobb, Ridley* 384. SELANGOR: *Ridley*. PERAK: *King's Collector* 1949, 2135, 10153; *Scortechini* 1275; *Wray* 1936, 2649. PANGKOR: *Curtis* 1640. PENANG: *Curtis* 1643. MALACCA: *Griffith* (K.D.) 2784; *Maingay* (K.D.) 912.—DISTRIB. Borneo; Sumatra.

17. COPTOPHYLLUM, Korthals.

Small erect simple shrubs with oblanceolate sparsely hairy leaves and ciliate stipules. *Flowers* pentamerous, crowded in bracteate capitules the outer bracts large and forming an involucre. *Calyx*-tube ovoid, its limb with 5 oblong ciliate lobes. *Corolla*-tube subinfundibuliform, its throat naked; the limb with 5 rather blunt lobes. *Stamens* 5, inserted below the middle of the corolla; *anthers* short, included. *Disk* annular, glandular. *Ovary* 2-celled, with numerous ovules on hemispheric placentas; *style* with 2 truncate arms. *Capsule* membranous, 2-celled. *Seeds* sub-rhomboid, scrobiculate; albumen fleshy; embryo clavate.—Two or three species; Malayan.

COPTOPHYLLUM CAPITATUM, Miq. Fl. Ind. Bat. II. 348. Herbaceous; stems compressed, thinner than a goose-quill, covered with short coarse rusty pubescence. *Leaves* membranous, oblanceolate, with a short blunt abrupt apiculus, the base much narrowed; upper surface dark-brown, sparsely and coarsely strigose, the lower paler brown, coarsely puberulous on the midrib nerves and transverse reticulations, otherwise glabrous; main-nerves 9 or 10 pairs, curved, ascending; length 5.5 to 7.5 in.; breadth 1.5 to 2.5 in.; petiole .5 to 1.25 in. *Stipules* .4 in. long, lanceolate with broad bases, the apices very acuminate, glabrous but the edges ciliate. *Peduncles* solitary, axillary, slender, compressed, sparsely hispid, 2 to 3 in. long, bearing at their apices single involucrete capitules. Involucre of 4 or more broadly ovate, sub-acute boldly 3-nerved bracts 4 in. long, the nerves and edges hispid. *Flowers* .2 in. long, glabrous, numerous, crowded, mixed with linear or spatulate fimbriate bracteoles about as long as themselves; pedicels short. *Calyx* with cylindrical campanulate tube; the mouth with 5 linear fimbriate-ciliate lobes longer than the tube. *Capsule* narrowly ovoid, crowned by the persistent calyx-lobes and within these by a mamillate disc, 2-celled, the placentas with rather numerous large shining brown pitted seeds.

JOHOR: *Ridley* 4179. SELANGOR: *Ridley* 8539. PERAK: *King's Collector* 10334.—DISTRIB. Sumatra.

Ridley's specimen collected in Johor (Herb. *Ridley* 4179) has stipules with blunt lobes and the bracts of the involucre are more numerous. It may be a new species.

18. MUSSAENDA, Linn.

Erect or scandent shrubs or undershrubs, rarely herbs. *Leaves* opposite or in whorls of three, membranous. *Stipules* solitary or in pairs between the petioles, free or connate, usually deciduous. *Flowers* in terminal cymes, the bracts and bracteoles deciduous. *Calyx-tube* oblong or turbinate; the limb with 5 mostly deciduous lobes, one of them however sometimes large petiolate petaloid (white or coloured), and persistent. *Corolla* funnel-shaped; the tube elongate, often sericeous outside, the throat always villous, the limb with 5 valvate lobes. *Stamens* 5, inserted on the throat or below it on short filaments; *anthers* linear. *Ovary* 2-celled, style filiform; *stigmas* 2, linear; *ovules* numerous, on peltate fleshy placentas. *Fruit* baccate, crowned by the scar of the deciduous calyx. *Seeds* minute, the testa pitted; embryo small, in dense fleshy albumen.—DISTRIB. Species about 40, in the tropics of Asia and of Africa, and in Polynesia.

- None of the calyx-lobes petaloid 1. *M. mutabilis*.
- One of the calyx-lobes sometimes petaloid:—
 - Lobes of the calyx persistent in the fruit:—
 - Leaves conspicuously hairy on both surfaces:—
 - Corolla not much longer than the calyx:—
 - Whole plant densely covered with long soft hair 2. *M. Wrayi*.
 - Lobes of the calyx not persistent in the fruit:—
 - Leaves conspicuously hairy on both surfaces:—
 - Corolla much longer than the calyx:—
 - An erect shrub; leaves slightly narrowed to the base; petioles less than 5 in. long ... 3. *M. macrophylla*.
 - Scandent; leaves much narrowed to the base; petioles often as much as 1 in. long ... 4. *M. villosa*.
 - Leaves glabrous or nearly so:—
 - Leaves oblong or lanceolate, much longer than broad:—
 - Leaves with broad rounded or cordate bases ... 5. *M. cordifolia*.
 - Leaves much narrowed to the base:—
 - Main-nerves 9 or 10 pairs 6. *M. polynœura*.
 - Main-nerves 5 or 6 pairs 7. *M. glabra*.
 - Leaves obovate-oblong to elliptic-oblong, about twice as long as broad:—
 - Calyx and corolla glabrous or nearly so ... 8. *M. oblonga*.
 - Calyx and corolla pubescent 9. *M. Teysmanniana*.
- Imperfectly known species 10. *M. membranacea*,

1. *MUSSAENDA MUTABILIS*, Hook. fil. Ic. Plant 1718. A climber, 15 to 40 feet long; young branches thinner than a goose-quill, terete, glabrous. *Leaves* membranous, on rather long petioles, broadly elliptic to elliptic-rotund from near the base; apiculate or shortly triangular acuminate at the apex, both surfaces glabrous; main-nerves 7 to 9 pairs, curving upwards, thin but prominent on the lower surface when dry; the reticulations open and transverse; length 5 to 7 in.; breadth 3 to 4.5 in.; petiole .75 to 1.25 in. *Stipules* forming an irregularly toothed pubescent ring of teeth of an inch or less in depth. *Cymes* terminal, much shorter than the leaves even in fruit, 2-branched, the stipules shorter than those of the stem. *Flowers* 1.5 to 2 in. long, from 8 to 12; bracteoles few, like the calyx-lobes but smaller. *Calyx-lobes* equal, lanceolate sometimes linear-lanceolate, acuminate, sparsely strigose externally, tomentose within, less than half as long as the corolla-tube, deciduous in the fruit. *Corolla* orange red, the limb about 2 in. across when fresh, the lobes elliptic-oblong, acute, with short coarse hairs on both surfaces; the tube cylindrical, .1 in. wide, very slightly expanded towards the apex, adpressed-pilose externally, pubescent internally. *Fruit* cylindrical sub-clavate, glabrous, faintly ridged, the apex blunt, narrowed at the base to the short pedicels; length .5 to .7 in.; diameter about .3 in. *Mussaenda Kintaensis*, Brace MSS. in Herb. Calc. *Acranthera Maingayi*, Hook. fil. Fl. Br. Ind. III. 192. *A. mutabilis*, Hems. Journ. Bot. 1877, 204. *Mussaenda Maingayi*, Stapf Trans. Linn. Soc. IV. 172.

PERAK: *King's Collector* 91, 855, 1856, 3276, 4255, 4999; *Wray* 1846; *Scortechini* 770; *Curtis* 2023. PENANG: *Ridley* 2187. JOHOR: *King* 559. MALACCA: *Derry* 1214. SINGAPORE: *Ridley* 1643.

VAR. *hirsuta*; under surfaces of leaves and young stems pubescent; all parts of the inflorescence villose-pubescent; stipules apiculate and twice as long as in the type.

PERAK: *King's Collector* 225. MALACCA: *Derry* 253. SINGAPORE: *Ridley* 1643.

2. *MUSSAENDA WRAYI*, King n. sp. A climber or occasionally a spreading shrub; young stems thinner than a goose-quill, covered like the leaves inflorescence and flowers with stiff more or less rusty hairs. *Leaves* membranous, elliptic or obovate-elliptic, much narrowed to the base, the apex shortly acuminate; main-nerves 9 to 14 pairs, curving upwards, thin but prominent on the lower surface; length .4 to .8 in.; breadth 1.75 to 4 in.; petiole .35 to .75 in.; stipules free, lanceolate-acuminate, about .25 in. long. *Cymes* solitary, terminal, condensed in flower, spreading in fruit, shorter than the leaves, the bracts lanceolate. *Calyx* densely pilose, infundibuliform, .5 to .7 in. long; the mouth with 5 deep lanceolate usually equal teeth, occasionally one of the teeth petaloid,

white, veined with green, narrowly elliptic or oblanceolate, acute, tapered to a short petiole, 3-nerved and with prominent reticulations, sparsely strigose, under 2 in. in length and less than half as broad. *Corolla* slightly longer than calyx, red, very pilose; the tube cylindric; the limb .4 or .5 in. across, with 5 broad short blunt lobes. *Fruit* oblong-ovoid, sparsely pilose, about .5 in. long and .3 in. in diam., crowned by the long persistent calyx-lobes.

PERAK: *Wray* 40, 1788, 2583; *King's Collector* 685, 1960, 10943, 5353? *Scortechini*; *Curtis* 1024. PENANG: *Curtis* 2730, 3304.

3. MUSSAENDA MACROPHYLLA, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 228. A shrub; young branches thinner than a goose-quill, rusty-pilose. *Leaves* thickly membranous, elliptic-oblong, slightly narrowed at the base, the apex shortly acuminate; upper surface sparsely strigose, the midrib rusty-pilose, the lower rusty-pilose especially on the midrib and nerves; main-nerves 9 to 11 pairs, slightly curved, ascending, prominent on the lower less so on the upper surface when dry; length 3 to 5 in.; breadth 1.5 to 2 in.; petiole .2 in.; stipules triangular, densely pilose, about .25 in. long. *Cymes* solitary, terminal, shorter than the leaves and condensed when in flower, many-flowered. *Calyx* about .5 in. long, narrowly infundibuliform, cut half way down into equal lanceolate teeth, pilose outside especially on the tube: enlarged lobe ovate, acuminate, 2 or 3 in. long, sparsely pubescent, with greenish ascending nerves; its petiole slender, about 1 in. long. *Corolla* yellow, twice as long as the calyx, densely pilose outside; the tube cylindric, widening in its upper half; the limb .3 or .4 in. in diam. with broad blunt lobes. *Fruit* unknown. Wall. Pl. As. Rar. II. 77, t. 180; Bot. Reg. XXXII. t. 24; DC. Prod. IV. 370. Wall. Cat. 6255. *M. hispida*, Don Prod. 139; DC. Prod. l.c. *M. frondosa*, Wall. Cat. 6250 A.

PERAK: *King's Collector* 6016. MALACCA: *Maingay* (K.D.) 835/2, 941.—DISTRIB. British India; Philippine Islands.

I follow the Flora of British India in referring this plant to *M. macrophylla*, Wall., but I have some doubt as to the accuracy of this view. The plant here described approaches, *M. villosa* very closely, and it is difficult to distinguish the two by words although specimens of the two look very different.

4. MUSSAENDA VILLOSA, Wall. Cat. 6254. A climber; young branches much thinner than a goose-quill, deciduously rusty-pilose. *Leaves* membranous, oblong, elliptic-ovate or -acute, much narrowed to the base, the apex shortly acuminate or acute, both surfaces (but especially the lower) sparsely pilose; main-nerves 9 to 12 pairs, thin but prominent on the lower surface (when dry), slightly curved, ascending; length 3 to 5 in.; breadth 1.25 to 2.25 in.; petiole .25 to 1 in., pilose; stipules lanceolate, caudate-acuminate, pilose, .4 in. long. *Cymes* ter-

minal and axillary, condensed when in flower, the branches very pilose; bracts narrowly oblong, .3 in. long. *Calyx* .3 to .4 in. long, pilose, the tube narrowly campanulate, shorter than the linear-lanceolate acuminate teeth; the odd lobe occasionally petaloid, ovate-rotund, bluntly acuminate, slightly narrowed to the long petiole, 5-nerved, glabrous above, pubescent below on the nerves, shorter than the leaves. *Corolla* yellow, .75 in. long, more than three times as long as the calyx, narrowly cylindrical in its lower half, slightly wider in the upper half; the limb only about .25 in. in diam., its lobes short, broad; the mouth closed by a mass of thick short hairs. *Fruit* oblong-clavate, with lax deciduous white hairs, about .5 in. long and .25 in. in diam. Hook. fil. Fl. Br. Ind. III. 191 (*among doubtful species*).

PERAK: *Scortechini* 240, 243; *Yapp* 213, 341; *Schomburgk* 17; *Curtis* 1024. PENANG: *King* 600; *King's Collector* 1755; *Curtis* 289, 1934. LANKAWI: *Curtis* 2871. PAHANG: *Ridley* 2188. KEDAH: *Curtis* 2521.

This species was (no doubt from want of good specimens) treated in the *Flora of British India* as a doubtful one. Since the *Flora* was written better specimens have been obtained.

VAR. *Herveyana*, King; *leaves* broadly ovate or elliptic, shortly and abruptly acuminate, smaller than in the typical form and densely clothed on the lower (less so on the upper) surface with soft white hairs; the young branches and inflorescence with smaller hairs.

MALACCA: *Hervey*.

5. MUSSAENDA CORDIFOLIA, Wall. Cat. 6260. A climber 20 to 60 feet long; young branches thinner than a goose-quill, terete, glabrous. *Leaves* thinly coriaceous, oblong, acute or shortly and bluntly acuminate, only slightly narrowed to the rounded, often slightly cordate base (occasionally narrowed to the base); both surfaces quite glabrous, the lower with distinct transverse reticulations; main-nerves about 8 pairs, curved, ascending, thin, slightly depressed on the upper surface and prominent on the lower; length 5 to 6.5 in.; breadth 1.75 to 2.5 in.; petiole .2 to .25 in.; rusty adpressed-pilose; stipules free, lanceolate, much acuminate, deciduously hirsute at the base. *Cymes* terminal and axillary, on long slender peduncles, many-flowered, rather lax, sparsely adpressed rusty-pubescent; bracts few, about .15 in. long. *Calyx* .2 in. long, cylindrical-campanulate, the lobes linear-lanceolate, shorter than the tube, spreading, one occasionally enlarged (2 to 2.5 in. long) and petaloid, ovate-oblong, creamy white, glabrous, with 5 or 6 pairs of ascending puberulous nerves, its petiole slender, .5 to .75 in. long. *Corolla* nearly 1 in. long, adpressed-pubescent outside, the tube narrowly cylindrical, slightly widening upwards, the limb only .2 in. wide, its lobes ovate,

acute, spreading, pubescent on both surfaces. *Fruit* broadly sub-ovoid, glabrous, crowned by the small cicatrix of the deciduous calyx-lobes, .35 in. long and about .25 in. in diam. *M. glabra*, Wall. Cat. 6251 sheets B. and C. *M. glabra*, Hook. fil. (not of Vahl) Fl. Br. Ind. III. 91 var. 4 and part of vars. 2 and 3.

PENANG: *King* 603; *Curtis* 116; *Deschamps*. PERAK: *King's Collector* 4859, 5216; *Scortechini* 458; *Maingay* (K.D.) 834. MALACCA: *Griffith* (K.D.) 2778 (in part).—DISTRIB. Mergui *Griffith* Herb. prop. 160.

The Wallichian No. 6260 consists of a single gathering from Penang and it was issued under this name. The same species forms, however, part of the Wallichian material distributed under the name *M. glabra*, the remarks under which may be read in the present connection.

6. MUSSAENDA POLYNEURA, King n. sp. Resembling *M. glabra*, Vahl, but having leaves with 9 or 10 pairs of little-curved ascending main-nerves with deciduous adpressed rufous hairs; the inflorescence and flowers, including the enlarged calyx-lobe, rusty pubescent. *M. glabra*, Wall. Cat. 6251 A. Hook. fil. Fl. Br. Ind. III. var. 4 in part.

MALACCA: *Griffith* (K.D.) 2776. PERAK: *King's Collector* 5775; *Wray* 1424.

This is one of the three species included under Wall. Cat. 6251 A.

7. MUSSAENDA GLABRA, Vahl Symb. Bot. III. 38. A climber; young shoots much thinner than a goose-quill, angled, with dark-coloured glabrous lenticellate bark. *Leaves* oblong-lanceolate, sometimes elliptic, the base narrowed and the apex shortly acuminate, glabrous except for some pubescence on the midrib and nerves; main-nerves 5 or 6 pairs curving upwards, thin but prominent on the lower surface when dry; length 2.5 to 3.5 in., breadth .5 in to 1.6 in., rarely 2 in.; petiole about .2 in.; stipules free, broad, bifid, the lobes acuminate, .2 to .3 in. long, puberulous. *Cymes* solitary on the apices of the terminal and lateral branches, longer than the leaves, their branches at first sometimes crowded but in fruit always lax, many-flowered, softly puberulous; bracts few, lanceolate, .2 in. long. *Calyx* narrowly campanulate, .2 in. long, the mouth with short spreading linear-lanceolate pubescent teeth; the tube sub-glabrous; occasionally one lobe petaloid (white), glabrous, ovate-acute, rounded at the base or narrowed to the long petiole with about 5 nerves radiating from the base, smaller than the leaves. *Corolla* yellow, pubescent, about four times longer than the calyx, narrowly cylindrical but somewhat dilated in its upper fourth; the limb only .2 in. across, its lobes spreading, triangular. *Fruit* oblong, slightly narrowed at the base and apex, the latter crowned by the scar of the deciduous calyx-lobes,

·5 in. long and ·3 in. in diam. when dry. DC. Prod. IV. 370; Wall. Cat. 6251 sheet A only and in part; Kurz. For. Fl. Burm. II. 56; Hook. fil. Fl. Br. Ind. III. 90 (*in part*).

MALACCA: *Maingay* (K.D.) 834; *Griffith* (K.D.) 2779. SINGAPORE: *Ridley* 116. MALACCA: *Derry* 31.—DISTRIB. British India.

VAR. *puberula*, upper surface of leaves glabrous except the puberulous midrib and nerves; lower surface puberulous or pubescent on the reticulations and sometimes on the interspaces also. *M. glabra* Vahl, VAR. 2: Hook. fil. l.c. 91.

SINGAPORE: *Walker* 65; *Anderson* 77; *Schomburgk* 43; *Ridley* 116a, 846a, 3651.

Under the No. 6251 and the name *M. glabra*, Wallich issued three gatherings bearing the letters A, B, and C. The gathering B was received from Herb. Finlayson, and the locality of its collection is unknown. Gathering C was received from Penang. Both these are the same as the plant issued as *M. cordifolia* and as No. 6260. The remaining gathering (A), as preserved in the Wallichian Herbarium in possession of the Linnean Society of London consist of three twigs, for one of which with almost glabrous flowers the name *M. glabra* is arbitrarily retained. Of the other two one has been referred by Sir Joseph Hooker to *M. Wallichii*, G. Don, and the third belongs to the species which I have named *M. polyneura*.

8. MUSSAENDA OBLONGA, King n. sp. A shrub 6 to 8 feet high; young branches as thick as a goose-quill, angled, somewhat compressed, pale, striate, sparsely lenticellate, glabrous. *Leaves* membranous, elliptic or obovate-oblong or obovate-lanceolate, much narrowed to the base, the apex shortly and rather abruptly caudate-acuminate; both surfaces glabrous, the lower pale (when dry); main-nerves 6 to 9 pairs, curved-ascending, slightly conspicuous; length 5·5 to 9·5 in.; breadth 1·75 to 3·5 in.; petiole ·4 to ·8 in., puberulous or glabrous; stipules triangular, linear-acuminate, glabrous, ·25 to ·4 in. long. *Cymes* solitary, terminal, shortly pedunculate, much shorter than the leaves even when in fruit, umbellate, lax, wide-spreading; the branches somewhat compressed, glabrous; bracts linear-lanceolate, ·2 in. long. *Calyx* ·3 to ·4 in. long, glabrous; the tube cylindric, slightly expanded above the base, its mouth with linear erect teeth shorter than or as long as the tube. *Corolla* pale yellow, twice as long as the calyx; the tube cylindric; the limb ·4 in. in diam., its lobes narrowly lanceolate. *Fruit* globular-ovoid, sometimes sub-obovoid, the apex broad, crowned by the cicatrix of the deciduous calyx. *M. longifolia*, Wall. Cat. 6258, (not of Lam.) *M. Wallichii*, G. Don, Hook. fil. Fl. Br. Ind. III. 88 (not of Don).

PERAK: *King's Collector* 1935, 3542; *Curtis* 3303.

9. MUSSAENDA TEYSMANNIANA, Miq. Fl. Ind. Bat. II. 213. A climber; young branches somewhat thinner than a goose-quill, terete, deciduously adpressed rusty-pilose, and with elongated lenticels. *Leaves*

membranous, broadly elliptic to obovate-oblong, shortly acuminate, more or less narrowed at the base; both surfaces of the young leaves (but especially the paler lower one) with minute adpressed rusty hair, the older glabrous except on the midrib and 7 or 8 pairs of slightly curved ascending rather short main-nerves; the connecting nerves wide and transverse; length 5 to 7 in.; breadth 2 to 3 in.; petiole .25 to .5 in. long, deciduously villous; stipules free, lanceolate, with broad bases and long linear apices, pilose, .15 to .2 in. long. *Cymes* terminal, lax, longer than the leaves, spreading, much branched, umbellately many-flowered; the branches minutely pubescent, the bracts at their divisions short and cup-like, those near the base of the flowers much longer (.1 to .2 in.) oblong, free. *Calyx* .15 to .3 in. long, sparsely pilose; the tube sub-cylindric shorter than the 5 narrowly lanceolate acuminate spreading teeth, one of the lobes occasionally petaloid and larger than the leaves, elliptic to elliptic-rotund, shortly apiculate, much narrowed to the long hairy petiole, puberulous on both surfaces, pubescent on the 5 radiating nerves. *Corolla* about three times as long as the calyx, its tube narrowly cylindric, slightly widened in its upper third and minutely strigose; the limb .25 in. across (when dry); its lobes broad, sub-acute. *Fruit* (unripe) cylindric, sub-clavate, crowned by the scars of the deciduous calyx-lobes.

PERAK; *King's Collector* 731, 855, 1910, 3276, 10345.—DISTRIB. Bali, *Teysmann*.

Imperfectly known species.

10. *MUSSAENDA MEMBRANACEA*, King n. sp. A climber; young branches thinner than a goose-quill, angled, dark-coloured, glabrous. *Leaves* membranous, broadly elliptic, sometimes slightly obovate, the apex shortly, broadly, and abruptly acuminate, the base gradually narrowed; both surfaces glabrous; main-nerves 5 to 7 pairs, little-curved, faint, spreading; length 2.75 to 4 in.; breadth 1.5 to 2 in.; petiole .6 to .8 in., stipules united to form a short glabrous cap. *Cymes* solitary, on a peduncle longer than the leaves, few-flowered, dichotomous, spreading, sub-glabrous, the bracts minute, subulate.

SINGAPORE: *Ridley* 1639.

This is only known by leaf-specimens. It is a very distinct species differing in form and texture of its leaves from any other *Mussaenda* in the Provinces. Its nearest ally seems to be *M. glabra*, Wall., and it much resembles a Tonquin species (hitherto unnamed) collected by Balansa (Herb. 624).

19. *TRISCIADIA*, Hook. fil.

A glabrous woody climber. *Leaves* coriaceous, few-nerved; stipules short, broad, connate below, 2-toothed, caducous, leaving an annular

scar. *Flowers* in paniced or ternate compound terminal umbels; bracts and bracteoles 0 (or if any caducous). *Calyx-tube* campanulate; limb coriaceous, tubular, minutely 5-toothed, ciliate, deciduous. *Corolla* coriaceous, salver-shaped; its tube short, glabrous everywhere; lobes of the limb as long as the tube, narrowly oblong, blunt, reflexed valvate in bud, their tips incurved. *Anthers* 5, linear, dorsifixed by short filaments on the throat of the corolla, versatile, exerted. *Ovary* 2-celled; style filiform; stigmas 2, linear-lanceolate; ovules 2 or more in each cell sunk in a fleshy placenta adnate to the septum. *Fruit* large, baccate, globular with leathery pericarp; seeds large compressed.—DISTRIB. A single Malayan species.

TRISCIADIA TRUNCATA, Hook. fil. in Benth. & Hook. fil. Gen. Plantar. II. 69. Young branches thinner than a goose-quill, pale-brown when dry. *Leaves* broadly elliptic to sub-rotund, obtuse or bluntly cuspidate, both surfaces olivaceous-brown when dry, the upper shining; the lower paler, dull; main-nerves 4 to 6 pairs, slightly curved, ascending, prominent on the lower surface; length 2·5 to 4 in.; petioles ·3 to ·5 in., stipules forming a tube only ·1 in. deep. *Umbels* 2·5 to 4 in. long, and about as much across. *Flowers* ·5 in. long, their pedicels about ·1 in. long. *Calyx* ·1 in. long, truncate, the limb minutely toothed. *Corolla* ·4 in. long, coriaceous, tubular, slightly expanded at the mouth and divided into 5 narrowly oblong, blunt, reflexed lobes about as long as the tube. *Fruit* globular, crowned by the large flat calyx-scar, about 1 in. in diam. *Webera truncata*, Roxb. Fl. Ind. ed. Carey and Wall. II. 538. *Stylcoryne truncata*, Wall. Cat. 8403. *Gupia truncata*, DC. Prod. IV. 394. *Pseudixora truncata*, Miq. Fl. Ind. Bat. II. 210.

PENANG: *Wallich*. PERAK: *Wray* 2104, 3271; *Scortechini*; *Ridley* 8374; *King's Collector* 5508, 6431, 6545.—DISTRIB. Andaman Islands; Sumatra; Java, *Forbes* 2504.

20. AULACODISCUS, Hook. fil.

Small glabrous trees. *Leaves* coriaceous; the stipules narrowly triangular, long-acuminate, caducous. *Flowers* small, polygamous, in axillary pedunculate many-flowered paniculate or umbellate cymes. *Calyx-tube* broadly hemispheric; the limb short and truncate-sinuate. *Corolla* coriaceous, rotate, the throat hairy; the limb with triangular-lanceolate, valvate, incurved lobes. *Stamens* 8 or 16, the alternate row imperfect; filaments flexuous; *anthers* dorsified, small, didymous. *Disk* large and prominent, 8- to 16-lobed. *Ovary* 6- to 16-celled; *ovules* numerous, on prominent placentas in the inner angles of the cells. *Berry* small, globose, areolate at the apex, usually 8- to 16-celled. *Seeds* numerous, minute, sub-globose; the testa thick, crustaceous, pitted;

embryo pyriform, in fleshy albumen.—DISTRIB. Two species, both Malayan.

A genus closely allied to *Urophyllum*.

Flowers in long-peduncled cymes with leafy bracts at the bases of branches; calyx a shallow cup; leaves acute 1. *A. premnoides*.

Flowers in shortly peduncled panicles without leafy bracts; calyx a deep cup; leaves acuminate ... 2. *A. Maingayi*.

1. *AULACODISCUS PREMNOIDES*, Hook. fil. in Gen. Plantar. II. 71. Young branches dark-coloured, 4-angled, glabrous. *Leaves* thinly coriaceous, oblong, shortly acuminate, the base slightly narrowed, both surfaces olivaceous-brown when dry, glabrous; the upper shining, the lower paler, dull and transversely reticulate; main-nerves 14 to 16 pairs, spreading to slightly curved; length 5.5 to 7 in.; breadth 1.25 to 1.65 in.; petiole .2 to .35 in. *Cymes* about 1.25 in. long and 1.5 in. in diam., pedunculate, axillary, trichotomously umbellate, rusty-puberulous; the common peduncle 1 in. long, the secondary half as long, each bearing at its base a leafy ovate-rotund petiolate bract .3 to .4 in. long. *Flowers* about .1 in. long, their pedicels longer. *Calyx* shallow, cupular, indistinctly toothed. *Corolla* much depressed in bud, the mouth with 8 inflexed lobes, hairy outside. Perfect *stamens* 8, included, broadly ovate, on short filaments. *Disc* large, convex, hairy, deeply 8-grooved. Hook. fil. Fl. Br. Ind. III: 97 *in part*. *Axanthes enneandra*, Wight in Calc. Journ. Nat. Hist. VIII. 144.

MALACCA: *Griffith* (K.D.) 2938.

2. *AULACODISCUS MAINGAYI*, King & Gamble n. sp. A tree; young branches as thick as a goose- or swan-quill, dark-coloured, obtusely 4-angled. *Leaves* thinly coriaceous, pale-brown when dry, oblong or oblong-elliptic, acute, slightly narrowed at the base; both surfaces shining, olivaceous-brown, the lower slightly paler; main-nerves 12 to 14 pairs, curved, spreading, thin but prominent beneath; length 6 to 8 in.; breadth 2 to 2.5 in.; petiole .25 to .5 in. *Panicles* pedunculate, cymose, with no leafy bracts at the bases of the branches, many-flowered, 1 to 1.5 in. in diam., slightly puberulous and with a few small bracteoles, the peduncles less than .5 in. long. *Flowers* .1 in. long, their pedicels longer. *Calyx* deeply cupular; sub-glabrous; its mouth truncate, entire. *Corolla* twice as long as the calyx, with 8 deep lanceolate reflexed lobes. *Style* long, reflexed over the disc.; *stigma* large. *Fruit* .25 in. in diam. *Aulacodiscus premnoides*, Hook. fil. in Fl. Br. Ind. III. 97 *in part*.

MALACCA: *Maingay* (K.D.) 938. SELANGOR: *Curtis* 2343. PERAK: *Scortechini* 2004; *King's Collector* 1086.—DISTRIB. Sumatra.

This is one of the two plants referred to *A. premnoides* by Sir Joseph Hooker in F.B.I. l.c. It appears to us to differ sufficiently from the other one (*Griffith* K.D.

2938) to deserve specific rank. It agrees with a Sumatra plant in Herb. Calcutta bearing the MSS. name *A. peltastigma*, Miq. But we can find no description of the species.

21. UROPHYLLUM, Wall.

Small trees or shrubs with terete slender branches. *Leaves* petiolate, usually elongate and acuminate. *Stipules* elongate small, rarely large. *Flowers* small (sometimes unisexual) in small axillary, sessile or pedunculate cymes or fascicles; their pedicels usually short, bracteolate at the base. *Calyx-tube* short, sub-globose or obconic, the limb cupular, persistent, usually 5-lobed (rarely 4- to 7-lobed). *Corolla* coriaceous, with a short tube and villous throat; the limb with 5 (rarely 4 to 7) erect or spreading triangular valvate lobes. *Stamens* 5 (rarely 4 to 7), inserted by short filaments in the throat. *Anthers* linear, acute, dorsifixed. *Disc* tumid, sulcate. *Ovary* 5 (rarely 4- to 7-celled); *style* short, often tumid at the base; *stigma* ovoid or clavate entire or notched. *Ovules* numerous, on axillary placentas. *Fruit* a small 4- to 5-celled many-seeded berry. *Seeds* minute, sub-globose; the testa pitted, crustaceous; the embryo clavate, in fleshy albumen.—**DISTRIB.** about 35 species; tropical Asiatic and African and one in Japan.

Leaves more or less hairy:—

The whole of the under surface of the leaves more or less pubescent:—

Leaves elliptic-oblong, 6 to 10 in. long:—

- | | | | |
|---|-----|----|--------------------------|
| Cymes with large permanent bracts | ... | 1. | <i>U. villosum</i> . |
| Cymes ebracteate or with small deciduous bracts | ... | 2. | <i>U. macrophyllum</i> . |

Leaves oblong-lanceolate, 2·5 to 5 in. long:—

- | | | | | |
|---|-----|-----|----|-------------------------|
| Pubescence of leaves, young branches and fruit cinereous | ... | ... | 3. | <i>U. hirsutum</i> . |
| Pubescence of leaves and young branches warm-ferrugineous, fruit glabrous | ... | ... | 4. | <i>U. ferrugineum</i> . |

Under surfaces of the leaves pubescent only on the midrib and nerves:—

Leaves 8 to 10 in. long:—

- | | | | |
|--|-----|----|---|
| Flowers on bracteolate pedunculate, trichotomously umbellate cymes several inches across | ... | 2. | <i>U. macrophyllum</i> ,
var. <i>corymbosa</i> . |
|--|-----|----|---|

Leaves 3 to 5 in. long:—

- | | | | | |
|---|-----|-----|----|---------------------------|
| Flowers in dense many-flowered sessile cymes or in few-flowered shortly pedunculate umbels; fruit sparingly hairy or sub-glabrous; leaves not bullate | ... | ... | 5. | <i>U. streptopodium</i> . |
|---|-----|-----|----|---------------------------|

Leaves everywhere glabrous:—

Flowers 5-merous:—

Umbels simple; flowers glabrous, on slender pedicels:—

Umbels 10- to 12-flowered; leaves caudate-acu-

minate, shining when dry, the main-nerves very prominent 6. *U. glabrum*.
 Umbels 4- to 6-flowered; leaves shortly acuminate, dull when dry; nerves not prominent ... 5. *U. streptopodium*.

Flowers 4-merous:—

Umbels compound, trichotomous; flowers pedicelled, with hirsute permanent bracteoles; corolla puberulous outside, hirsute inside 7. *U. trifurcum*.
 Cymes 8- to 10-flowered; flowers sessile puberulous 8. *U. potatorum*.

1. *UROPHYLLUM VILLOSUM*, Jack & Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 185. A shrub to 10 feet high; young branches nearly as thick as a goose-quill, covered with adpressed yellowish hair. *Leaves* coriaceous, pale, yellowish-green when dry, oblong-elliptic, caudate-acuminate, the base slightly narrowed or rounded; upper surface glabrous; the lower boldly reticulate and bearing many pale subadpressed hairs especially on the nerves and veins; midrib prominent, tomentose; main-nerves 10 or 11 pairs, much curved, ascending, bold on the lower surface; length 7 to 10 in.; breadth 2·75 to 3·25 in.; petiole ·3 in., tomentose. *Stipules* narrowly oblong-lanceolate, blunt, tomentose below, ·8 in. long. *Cymes* ·4 to ·8 in. long, on pedicels of the same length, about ·8 in. in diam., condensed; bracts numerous, narrowly oblong, blunt, pilose, persistent. *Flowers* densely crowded, their pedicels short, pubescent. *Calyx* campanulate, ·25 in. long, with 5 triangular blunt spreading lobes, pubescent on both surfaces. *Corolla* longer than the calyx, cylindric-campanulate, thick, deeply divided into 5 oblong concave lobes, the throat densely pilose; *stamens* linear, glabrous. *Fruit* sub-globular, truncate at the apex and crowned by the short triangular calyx-teeth, sparsely villous, 3 in. in diam. when dry. Wall. Cat. 8314; DC. Prod. IV. 441; Hook. fil. Fl. Br. Ind. III. 99.

PENANG: Wallich; King; Maingay (K.D.) 884; Curtis 178, 7201.
 PERAK: Wray 2634; Scortechini 1983; King's Collector 526, 2563; Ridley 9711. SINGAPORE: Lobb 322.

2. *UROPHYLLUM MACROPHYLLUM*, Korth. Young branches slender, obtusely 4-angled, at first densely and minutely pubescent, sometimes becoming ultimately almost glabrous. *Leaves* membranous, elliptic-oblong, sometimes obovate-elliptic, shortly and rather abruptly acuminate, the base cuneate; upper surface olivaceous-green when dry, glabrous except the depressed-pubescent midrib; the lower pale-olivaceous, the midrib and 9 to 11 pairs of curved ascending main-nerves prominent and pale pubescent, the interspaces and rather distinct transverse veins also pubescent; length 6 to 10 in.; breadth 1·75 to 3 in.; petiole ·4 to ·6 in.; stipules lanceolate, adpressed-pubescent, ·4 to ·6 in. long

Cymes 8- to 10-flowered, ebracteate or bracts small and fugacious, when in flower not much exceeding the petioles in length; the peduncles much shorter (longer in var. *corymbosa*) than the pubescent pedicels. *Flowers* .15 in. long, their pedicels .3 to .4 in. long. *Calyx* a shallow truncate adpressed-hairy cup, its mouth with 5 short triangular teeth. *Corolla* longer than the calyx, glabrous. *Fruit* globular, glabrescent, crowned by the calyx-lobes, .15 in. in diam. Koord. & Valet. Bijdr. 8, 68. *Axanthes longifolia*, Wight in Calc. Journ. Nat. Hist. VII. 145 t. 2, f. 1. *U. strigosum*, Kurz Fl. Burm. II. 53 (not of Korthals). *U. longifolium*, Hook. fil. Fl. Br. Ind. III. 99.

PERANG: *Curtis* 2753. SELANGOR: *Ridley* 7440, 8576. PERAK: *Wray* 2201, 3511; *Scortechini* 267, 715; *King's Collector* 2838, 2948, 2964.

VAR. *corymbosa*; cymes 1 or 2 in the axils of the leaves, often as much as 3.5 in. long (including the long peduncle), trichotomously corymbose; stipules longer than the petioles, broadly oblong lanceolate, sometimes auricled at the base, pubescent. *Urophyllum corymbosum*, Korth. Ned. Kruidk. Arch. II. 194; Koord. & Valet. Bijdr. 8, 73.

PERAK: *Scortechini*. *King's Collector*, 2263, 2298, 2409, 5723. JOHOR: *King*.—DISTRIB. Sumatra, Java.

3. *UROPHYLLUM HIRSUM*, Hook. fil. Fl. Br. Ind., II. 98. Young branches slender, softly cinereous-tomentose like the stipules, petioles, and inflorescence. *Leaves* membranous, oblong-lanceolate or narrowly elliptic, acuminate, the base rounded or sometimes narrowed; upper surface glabrous, rarely sub-glabrous; the lower with pale soft spreading hairs especially on the midrib and nerves; main-nerves 8 to 10 pairs, curved, ascending; length 3 to 5 in.; breadth 1 to 2 in.; petiole .15 to .25 in.; *stipules* much longer than the petioles, linear-lanceolate. *Cymes* small, capitate, sessile, few-flowered, with a few ovate-lanceolate bracts. *Calyx* hairy, on a short stalk; the tube very short; the limb with 5 broad triangular spreading lobes. *Corolla* hairy. *Fruit* depressed-globose, the apex truncate, crowned by the small remains of the calyx, sparsely pubescent, .15 to .2 in. in diam. when dry. *Axanthes hirsuta*, Wight in Calc. Journ. Nat. Hist. VII. 148. *Wendlandia bifaria*, Wall. Cat. 6278.

MALACCA: *Maingay* (K.D.) 873; *Griffith* (K.D.) 2939; *Wallich*, *Goodenough*. PERANG: *Ridley* 10251. SELANGOR: *Ridley* 7442. NEGRI SEMBILAN: *Ridley* 10100. SINGAPORE: *Ridley* 3906, 4913, 8428. JOHOR: *Ridley* 4912, 11173, 11174. PERAK: *Scortechini* 84; *Wray* 152, 1305, 2488; *King's Collector* 199, 10494. PAHANG: *Ridley* 2204, 2206.

This species varies considerably as to the amount of hair on the leaves and as to the number of the main-nerves. I refer to it with some hesitation *Ridley* 11176 from Johor, No. 8577 from Selangor, *Scortechini* 267 from Perak.

4. *UROPHYLLUM FERRUGINEUM*, King and Gamble n. sp. A slender small tree. Young stems softy, minutely, and rather sparsely rusty-tomentose. *Leaves* membranous, narrowly oblong-lanceolate, caudate-acuminate, the base slightly narrowed or rounded; upper surface glabrous, the midrib distinct, depressed, the main-nerves faint when dry; lower paler, sparsely rusty-sericeous between the nerves; the main-nerves themselves about 7 pairs, curved, ascending, distinct and, like the midrib, densely rusty-sericeous; length 2·5 to 3·5 in.; breadth ·5 to 1 in.; petioles ·15 to ·4 in., tomentose; stipules more than twice as long as the petioles, narrowly oblong-lanceolate, rusty-sericeous. *Cymes* not much exceeding the petioles, almost sessile, few-flowered, with a few small lanceolate bracts at their bases. *Flowers* on pubescent pedicels equal to or longer than themselves. *Calyx* shortly campanulate, with 5 broad short pointed teeth, almost glabrous. *Corolla* white, glabrous, larger than the calyx, the tube shortly cylindric; the teeth 5, rather large, triangular, acute. *Fruit* depressed globular, truncate at the apex and bearing the small calyx-teeth, glabrous, ·2 in. in diam.

PERAK: *Ridley* 2930, 9736; *Curtis* 2017; *Wray* 2065, 3933; *King's Collector* 780, 4112; *Scortechini* 205. KEDAH: *Ridley*.

A species near *U. streptopodium*, Wall., but readily distinguished by its soft silky hair. This is closely allied to a Bornean species collected by Beccari, P.B. 1840, and by Ridley, 2781, which has however longer pedicelled flowers and hairy fruit.

5. *UROPHYLLUM STREPTOPODIUM*, Wall. Cat. 8317; Hook. fil. Fl. Br. Ind. III. 99. A shrub or small tree; young branches less than half as thick as a goose-quill, yellowish-brown, at first minutely adpressed-pubescent, ultimately often glabrous. *Leaves* thinly coriaceous, elliptic-oblong to oblanceolate, shortly acuminate, much narrowed from near the middle to the base, both surfaces greenish-yellow to pale olivaceous-brown when dry, the upper glabrous; the lower paler, transversely reticulate, minutely scaly, glabrous, or finely pubescent on the midrib and 5 to 8 pairs of curved, ascending main-nerves and also sometimes on the transverse veins; length 2·5 to 6 in.; breadth ·8 to 2 in.; petioles ·25 to ·5 in., adpressed-pubescent or glabrous. *Stipules* narrowly oblong-lanceolate, acute or blunt, sparsely adpressed-pubescent or sub-glabrous, slightly longer (some twice as long) as the petioles. *Cymes* axillary, from as long to twice as long as the petioles, many-flowered dense and sessile, or umbellate on short bracteolate peduncles and few-flowered. *Flowers* about ·15 in.-long, on pubescent pedicels lengthening in fruit to ·1 to ·2 in. *Calyx* sub-glabrous, cupular-campanulate, the mouth with 5 (occasionally 6) small, more or less acute triangular lobes. *Corolla* one and a half to nearly three times as long as the calyx, campanulate, with 5 deep oblong blunt, sub-erect or reflexed lobes, often hairy on the

inner surface. *Fruit* sub-globular, depressed, the apex truncate and crowned by the minute remains of the calyx, glabrous or sparsely hairy, .1 to .2 in. in diam. *U. parviflorum*, Wall. Cat. 8320; *U. glabrum*, Wall. Cat. 8316 *in part.* *Urophyllum*, Wall. Cat. 8315? *U. Blumeanum*, Hook. fil. Fl. Br. Ind. III. 99. *U. umbellulatum*, Miq. Fl. Ind. Bat. Suppl. 542; Hook. fil. Fl. Br. Ind. III. *Geniostomum acuminatum*, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 316; Wall. Cat. 9067. *Timonius acuminatus*, Wall. Cat. 6218. *Axanthes Blumeanus*, Wight in Calc. Journ. Nat. Hist. IV. 145.

In all the provinces; a common and variable plant passing into *U. glabrum* and doubtfully distinct therefrom.

6. *UROPHYLLUM GLABRUM*, Wall. in Roxb. Fl. Ind., ed. Carey and Wall. II. 186. A shrub; or small tree 15 to 20 feet high; young branches half as thick as a goose-quill, obtusely 4-angled and grooved, puberulous, becoming glabrous. *Leaves* thinly coriaceous, elliptic, oblong-elliptic, or oblong, shortly acuminate, slightly narrowed or rounded at the base; both surfaces pale yellowish- or olivaceous-brown when dry, glabrous and reticulate, the midrib bold, depressed on the upper surface but prominent on the lower, like the 7 to 12 pairs of curved, spreading, main-nerves; length 4 to 9 in.; breadth 1.5 to 3 in.; petioles .3 to .5 or sometimes 1 in. long, puberulous or glabrous; *stipules* linear-oblong, blunt; adpressed-pubescent, somewhat longer than the petioles. *Umbels* axillary, 10- to 12-flowered, bracteolate, on peduncles varying from .25 to .5 in. or even 1 in. in length, rarely sub-sessile. *Flowers* .15 in. long, on slender pedicels .2 to .3 in. long. *Calyx* widely cupular, truncate or minutely toothed, glabrous. *Corolla* glabrous, longer than the calyx, its mouth with 5 deeply triangular lobes. *Anthers* ovate, surrounded by long hairs. *Fruit* depressed-globular, crowned by the wavy calyx, .2 in. in diam. Wall. Cat. 8316 (excl. B); DC. Prod. IV. 441; Kurz Fl. Burm. II. 53. Hook. fil. Fl. Br. Ind. II. 98. Koord. & Valet Bijdr. 8, 66. *Urophyllum*, Wall. Cat. 8318, 8319, 8322. *U. arboreum*, Korth. in Ned. Krindk. Arch. II. 194. *U. repandulum*, Miq. Fl. Ind. Bat. II. 353. *Aaxanthes arborea*, Blume Bijdr. 1603. *Wallichia arborea*, Reinw. ex Blume in Flora 1825, 107. *Urophyllum Griffithianum*, Hook. fil. Fl. Br. Ind. III. 98. *Axanthes Griffithiana*, Wight in Calc. Journ. Nat. Hist. VII. 147.

In all the provinces; very common.

7. *UROPHYLLUM TRIFURCUM*, H. H. W. Pearson MSS. Young branches terete, dark-coloured, glabrous, half as thick as a goose-quill. *Leaves* coriaceous, oblong-elliptic, shortly acuminate, the base rounded or slightly narrowed; both surfaces glabrous except the depressed pubescent midrib and nerves on the upper, the lower reticulate, shining; main-

nerves 10 to 12 pairs, curved, spreading, very prominent beneath; length .6 to .8 in.; breadth 2.5 to 3.25 in.; petioles .5 to .75 in. stout. *Flowers* in pedunculate trichotomous axillary compound umbels, the common peduncle 1 to 1.25 in. long, rusty-puberulous; the secondary umbels on short peduncles 6- to 8-flowered, with broadly ovate hirsute deciduous bracteoles at their bases. *Flowers* .25 in. long, on rusty-pubescent pedicels shorter than themselves. *Calyx* cupular; its mouth truncate, undulate. *Corolla* as long as the calyx; its 4 lobes broad, blunt, puberulous outside, hirsute inside. *Fruit* unknown.

JOHOR: *Ridley* 4084, 7441; *Scortechini*. SELANGOR: *Ridley* 7441, 7435, 8540. PAHANG: *Ridley* 11180.

8. *UROPHYLLUM POTATORUM*, King n. sp. A small tree; all parts except the flowers glabrous; young branches thinner than a goose-quill, terete, pale-brown when dry. *Leaves* coriaceous, elliptic-oblong, caudate-acuminate, the base cuneate, both surfaces brown tinged with olivaceous when dry, dull; main-nerves 5 to 9 pairs prominent like the midrib on the lower surface and depressed on the upper, veins faint on both; length 4 to 8 in.; breadth 1.25 to 1.75 in.; petiole .2 to .25 in. stout; *stipules* ovate, much acuminate. *Cymes* axillary, longer than the petioles, 8- to 10-flowered. *Flowers* crowded, puberulous externally. *Calyx* sessile, cylindrical, the limb obscurely toothed, .2 in. long. *Corolla* longer than the calyx; the 4 lobes oblong, blunt, reflexed. *Fruit* unknown.

MALACCA: on Mount Ophir. *Hullett* 104; *Wray* 756. PERAK: *King's Collector* 3211.

The flowers in the only three specimens which I have seen are in bad condition, but they appear to be those of *Urophyllum*. According to Mr. Wray's field note, the flower is whitish-green and the fruit is orange or yellow when ripe. The leaves of the plant are used by the Malays to make a decoction which they drink as a beverage that appears to have some of the physiological effects of tea.

NOTE.—In addition to the foregoing species from the Malay Peninsula we take this opportunity of describing the following very distinct species which has hitherto been collected only in the Andaman Islands.

UROPHYLLUM ANDAMANICUM, King & Gamble n. sp. Young branches brown, thinner than a goose-quill, glabrous but for a very few scattered hairs near the nodes. *Leaves* oblanceolate, shortly and rather abruptly acuminate, narrowed from above the middle to the short petiole; upper surface pale olivaceous when dry, glabrous; the lower paler, glabrous, except the rusty adpressed-pilose midrib and nerves, transversely reticulate; main-nerves 10 to 12 pairs, ascending, very slightly curved; length 5 to 7.5 in.; breadth 1.5 to 2.25 in.; petiole .25 to .35 in. *Stipules* lanceolate, much acuminate, densely rusty-pilose on the lower surface. *Cymes* 1 to 3 in a leaf-axile, on slender *peduncles* much longer than the petioles, densely umbellate, many-flowered, the flowers on coarsely rusty-pubescent pedicels, mostly longer than themselves. *Flowers* .15 in. long. *Calyx* deeply cupular, pubescent outside like the pedicels; the mouth truncate and usually entire, sometimes minutely toothed. *Corolla* twice as long as the calyx, glabrous except the densely pilose

throat; the lobes deep, broadly lanceolate, acute. *Fruit* sub-globular, truncate, the top bearing the wide-cupular calyx-limb, puberulous, .15 in. in diam.

ANDAMAN ISLANDS: *King, Prain.*

22. ADENOSACME, Wall.

Shrubs with terete brittle branches. *Leaves* membranous, with many pinnate nerves; *stipules* lanceolate, sometimes toothed. *Flowers* in axillary or terminal paniculate, spreading cymes, bracts often glandular. *Calyx-tube* globose or hemispheric, with 4 to 6 persistent lobes. *Corolla* tubular; its lobes 4 to 6, triangular or oblong, valvate in bud, their edges everted. *Stamens* 4 to 6, inserted by short filaments on the tube. *Ovary* 2- or 5-6-celled; *style* slender or thickened above; *stigmas* 2 or 5-6, linear; *ovules* very numerous, on fleshy peltate placentas. *Fruit* a globose berry, with coriaceous or fleshy epicarp, crowned by the remains of the calyx, 2- to 5-6-celled, indehiscent or dehiscing loculicidally at the apex; seeds many on sub-globose placentas. *Seeds* small, angled, dotted; embryo minute in fleshy albumen.—*DISTRIB.* Species about 6; Indian and Malayan.

Flowers .15 in. long, numerous, in much-branched
paniculate cymes 2 to 6 in. long 1. *A. longifolia.*

Flowers .6 in. long, few, in small pedunculate cymes
not exceeding 1 inch in length 2. *A. Scortechinii.*

1. ADENOSACME LONGIFOLIA, Wall. Cat. 6280. Two or three feet high; stems as thick as a goose- or swan-quill, straw-coloured, shining, glabrous. *Leaves* elliptic-lanceolate, elliptic-oblancoelate or elliptic, apex rather shortly acuminate, the base much narrowed from above or below the middle to the usually elongate petiole, upper surface dark olivaceous when dry, glabrous, puberulous or pubescent; lower surface always paler and usually more pubescent than the upper; main-nerve 10 to 24 pairs, curved, spreading, thin but distinct on both surfaces; length 6 to 12 in.; breadth 1.5 to 4.5. *Stipules* oblong, blunt, about .3 in. long. *Cymes* paniculate, from 2 to 6 in. across, never more than half as long as the leaves and usually much shorter, solitary, many-flowered, branching from the base or on short peduncles, the branches slender, angled, glabrous or puberulous, the smaller ones zig-zagged and very thin. *Flowers* .15 in. long, shorter than their pedicels, solitary or in fascicles of 2 or 3. *Calyx* almost globular, sparsely pubescent outside; the 5 or 6 lobes spreading, their edges with a few thick elongate glands. *Corolla* not much exceeding the calyx, densely hirsute outside, glabrous inside; the lobes erect, oblong, blunt. *Stamens* subsessile. *Capsule* turbinate, transversely elongated, .2 in. in diam., faintly 2-lobed, with many vertical lines, the epicarp brittle, sub-glabrous, pure white. *Miq. Fl. Ind. Bat.*

II. 217; Kurz For. Fl. Burm. II. 160; Hook. fl. Fl. Br. Ind. III. 95. *A. Malayana*, Wall. Cat. 6282. *Bertiera javanica*, and *B. fasciculata*, Blume Bijdr. 987; DC. Prod. IV. 392. *Mycetia javanica*, Reinw. *Rondeletia longifolia*, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. II. 137; Don Prodr. Fl. Nep. 138. *Wendlandia longifolia*, DC. l.c. 412. *W. Malayana*, G. Don Gen. Syst. III. 519.

In all the provinces, more or less common.

Varying considerably as to the length of the leaves and petioles and as to the breadth of the former. The flowers are 2- or 3-morphic in the matter of style and stamens.

2. *ADENOSACME SCORTECHINII*, King & Gamble n. sp. A shrub 6 to 8 feet high; branches as thick as the little finger, the youngest much thinner; bark corky, at first pubescent and brown, but afterwards exfoliating, and very pale and deeply grooved. *Leaves* obovate-elliptic or broadly oblanceolate, shortly and abruptly acuminate, much narrowed to the base; upper surface brown and glabrous, the lower paler, puberulous on the midrib, main-nerves and rather distinct transverse veins; main-nerves 16 to 18 pairs, sub-horizontal, prominent beneath; length 8 to 13 in.; breadth 3 to 5 in.; petiole .5 to 1.25 in., pubescent; *stipules* shorter than the petioles, triangular, acute. *Cymes* several from the axils of fallen leaves, under 1 in. in length including the short peduncle, minutely rusty-tomentose, with a pair of lanceolate bracts .15 in. long at the apex of the peduncle and a few minute bracteoles on the branchlets. *Flowers* about .6 in. long. *Calyx* campanulate, .15 in. long; the teeth 5, narrowly lanceolate, longer than the tube. *Corolla* four times as long as the calyx, tubular, inflated at the base and contracted below the limb; lobes of limb 5, lanceolate. *Anthers* 5, sessile at the base of the tube, linear, acute. *Style* shorter than the corolla-tube, filiform, divided into 5 linear puberulous stigmatic arms; *ovary* 2-celled, with numerous ovules from 2 placentas attached to the septum. *Capsule* unknown.

PERAK: *Scortechini*; King's Collector 2223; Wray 1474. SELANGOR: Ridley 7400.

23. BRACHYTOME, Hook. fl.

Glabrous shrubs with petiolate membranous leaves; *stipules* triangular, acuminate, persistent. *Flowers* small, polygamo-dioecious, in small slender cymose panicles from the axils of undeveloped leaves, bracts minute. *Calyx* with an ovoid or oblong tube (short in the male) and a cupular, 5-toothed persistent limb. *Corolla* glabrous, widely funnel-shaped, the limb with 5 short lobes, twisted in bud. *Anthers* sub-sessile on the throat of the corolla, included, linear-oblong, imperfect in the female flowers, *Disc* small and annular in the male

flower; cupular and larger in the female. *Ovary* 2-celled; *style* filiform (short in the male); *stigmas* 2, short, oblong, obtuse, grooved; *ovules* very numerous, borne on the surface of peltate tumid placentas. *Berry* small, globular or ovoid, 2-celled, many-seeded. *Seeds* cuneate, compressed, with thin reticulate testa, and fleshy albumen; embryo small, sub-cylindric.—**DISTRIB.** Two species; one Eastern Himalaya and one Malayan.

BRACHYTOME SCORTECHINII, King & Gamble n. sp. A shrub 6 to 12 feet high; young branches twice as thick as a crow-quill, somewhat compressed. *Leaves* thinly membranous, narrowly elliptic, tapering about equally to each end, the apex acuminate, both surfaces pale olivaceous when dry, the lower tinged with brown; main-nerves 10 to 14 pairs, spreading, curving slightly upwards, prominent on the lower surface; length 4 to 8 in.; breadth 1.5 to 2.5 in.; petiole .2 to .25 in.; *stipules* shorter than the petioles, broadly triangular, keeled, acuminate. *Cymes* 1 to 1.5 in. long, with few, spreading, lax branches. *Flowers* .35 in. long. *Calyx* about the same length as the corolla; its tube ovoid, constricted below the short, obscurely 5-toothed limb. *Berry* globular, .3 in. in diam., smooth, crowned by the short calyx-limb.

PERAK: at elevations of 3,000 to 4,000 feet; *Scortechini* 14, 237, 1215; *King's Collector* 2136, 2930; *Wray* 950, 2812, 2999.

This resembles *B. Wallichii*, Hook. fl., the only other species of the genus as yet described; but that has leaves of thicker texture, more numerous flowers, and ellipsoid fruit.

24. **STYLOCORYNA**, Cav.

Trees or shrubs, with pubescent or glabrous usually membranous leaves and ovate-triangular, usually deciduous stipules. *Flowers* in terminal corymbose bracteolate cymes, 5-merous. *Calyx-tube* ovoid or campanulate; the limb short or long, always 5-cleft. *Corolla* funnel-shaped, its tube varying in length, the throat glabrous; the limb 5-lobed, narrow, reflexed or spreading. *Stamens* 5, on the mouth of the corolla, sessile or on short filaments; the *anthers* narrow, exerted. *Ovary* 2-celled; *style* stout; *stigma* long, usually thicker than the style; fusiform or clavate; *ovules* numerous, rarely 2 in each cell, often immersed in the peltate placentas. *Fruit* globose, baccate, without pulp, 2-celled; cells 2- or many-seeded. *Seeds* angled; albumen fleshy or horny; embryo small; cotyledons small, leafy.—**DISTRIB.** Probably about 15 species; tropical Asiatic.

The above definition is limited so as to include only the pentamerous many-seeded species which in Hooker's *Flora of British India* are included in the genus *Webera* of Schreber (founded in 1791). Some recent authors refer these species to *Tarenna* a genus established by Gaertner in 1788 for *T. Zeylanica* (Gaertner. *Fruct.*

I. 139, t. 28). Gaertner however, defines and figures *Tarenna* as tetramerous. We therefore for these pentamerous species revive the genus *Stylocoryna* (established in 1797 by Cavanilles; Cav. *Ic.* IV. 46, t. 368) which that author describes as pentamerous and many-seeded. For the genus *Webera* of Schreber we reserve in the present work certain tetramerous uni-ovulate plants which in external characters resemble *Iwora* and *Pavetta*. In Engler's *Pflanzen-familien* *Webera*, Schreb., is reduced to *Chomelia*, a genus founded by Linnæus in 1737. This name *Webera* was subsequently adopted by two botanists, Jacquin and Velloso, for two distinct genera. There is thus much confusion connected with it.

Leaves much longer than broad, tapering about equally to apex and base; cymes contracted:—

Main nerves of leaves faint on both surfaces:—

Leaves oblong-lanceolate quite glabrous; calyx puberulous, its lobes long, linear 1. *S. angustifolia*.

Leaves narrowly elliptic-oblong; lower surfaces minutely adpressed-hairy; the upper glabrous except the midrib; calyx pubescent, its lobes very short, acute 2. *S. adpressa*.

Main nerves prominent on the lower surface:—

Leaves hispid on the upper surface, softly pubescent on the lower; calyx densely covered with long stiff pale hairs; its lobes long, linear... 3. *S. Maingayi*.

Leaves about twice (rarely three times) as long as broad; cymes spreading; main-nerves 10 to 12 (rarely so few as 6) pairs, bold and prominent on the lower surface:—

Leaves obovate, glabrous except for tufts of hair in the nerve axils beneath 4. *S. costata*.

Leaves elliptic-oblong to elliptic-lanceolate or elliptic:—

Both surfaces of the leaves glabrous except for a few hairs on the midrib 5. *S. fragrans*.

Upper surface of the leaves hispidulous, the lower softly pubescent 6. *S. mollis*.

1. *STYLOCORYNA ANGUSTIFOLIA*, King n. sp. A shrub 4 to 6 feet high, glabrous except the inflorescence; young branches striate, thinner than a goose-quill. *Leaves* coriaceous, narrowly oblong-oblong, much but rather bluntly acuminate, gradually narrowed from the middle to the petiole, the edges (when dry) much recurved; both surfaces blackish when dry, shining, the midrib deeply depressed on the upper, bold and prominent on the lower surface; main-nerves 5 or 6 pairs, oblique, ascending, indistinct on both surfaces; length 2.5 to 3.5 in.; breadth .75 to 1 in.; petiole .2 to .35 in. *Stipules* broad, transversely oblong, abruptly acuminate, .25 in. long. *Cymes* less than 1 in. in diam., solitary, terminal, shortly pedunculate, not (even including the peduncles) half so long as the leaves, the branches few, ascending, compressed, puberulous with lanceolate spreading bracteoles; 3- to 5-flowered,

Flowers .35 in. long, puberulous externally, on short pedicels bracteolate at the base. *Calyx* puberulous, campanulate, with short tube and 5 long narrowly linear-lanceolate spreading lobes. *Corolla* not much exceeding the calyx, with a short tube and 5 imbricate oblong acute lobes united only at the sericeous bases, minutely pubescent on the outer surface, glaberrulous on the inner. *Anthers* 5, linear, united into a tube round the long cylindrical style, the filaments free, dorsifixed. *Ovary* sunk in the calyx tube and attached to it, 2-celled, the placentas infolded, several seeded. *Fruit* un nown.

PERAK: *King's Collector* 8265. Only once collected. A very distinct species.

2. *STYLOCORYNA ADPRESSA*, King n. sp. A shrub; young branches thinner than a goose-quill, obtusely 4-angled, covered with short rusty deciduous tomentum. *Leaves* thinly coriaceous, narrowly elliptic-oblong, often slightly oblanceolate, shortly and sharply acuminate, the base much narrowed; both surfaces dark olivaceous when dry, the upper glabrous and minutely reticulate; lower surface and especially the midrib with short sparse stiff adpressed pale hairs; main-nerves 6 to 10 pairs, curved, spreading, faint on the upper surface, distinct on the lower; the midrib stout, channelled above; length 4 to 8 in.; breadth .75 to 1.75 in.; petioles .25 to .4 in. *Stipules* ovate, acute, .15 in. long, deciduous. *Cymes* solitary, terminal, about 1 in. long (including the short peduncle), dichotomous, few-flowered; the branches divergent, densely tomentose. *Flower-pedicels* short, bi-bracteolate at the base. *Flower* about .6 in. long. *Calyx* urceolate .1 in. long, with 5 short acute teeth. *Corolla-tube* .35 in. long, minutely pubescent without like the calyx, twice as long as the oblong, blunt lobes of the limb. *Anthers* linear, subsessile. *Fruit* pisiform, the apex with the small scar of the calyx, glabrous; seeds two in each cell, many-angled.

In all the provinces; common.

VAR. *papillulosa*. *Leaves* 3.5 to 4 in. long, coriaceous, lower surface with numerous minute dark-brown papillæ, the pubescence rusty.

SINGAPORE: *Ridley* 3885, 4960. JOHOR: *Ridley* 2879. PAHANG: *Ridley* 1087.

The only specimens of this which I have as yet seen are rather imperfect. It is quite possible that it will have to be treated as a species when fuller material is obtained.

3. *STYLOCORYNA MAINGAYI*, King. A shrub; young branches thinner than a goose-quill, densely tawny or rusty-tomentose. *Leaves* thickly membranous, elliptic-lanceolate to elliptic-ovate, shortly caudate-acuminate, the base cuneate; upper surface sparsely hispid-pubescent; the lower softly pubescent; main-nerves 8 or 9 pairs, spreading, curved,

depressed like the midrib on the upper surface when dry and prominent on the lower; length 3 to 6·5 in.; breadth 1·5 to 3 in.; petiole ·25 to ·35 in. *Stipules* lanceolate with long filiformly acuminate apices, rusty-pubescent, ·5 in. long. *Cymes* in condensed sub-globular panicles 1·5 to 3 in. in diam.; the branches short, covered like the calyces externally with long pale soft hairs and bearing many long filiform pubescent bracteoles. *Flowers* ·7 in. long (excluding the style) on slender short pedicels. *Calyx* flask-shaped, ·15 in. long, the mouth with 5 long linear, recurved stiffly pubescent lobes. *Corolla* with cylindric pubescent tube more than twice as long as the blunt oblong lobes of the limb. *Ovary* 2-celled, each cell with several triangular ovules, disk thick cushion like. *Fruit* the size of a large pea, glabrous, the calyx-scar small. *Seeds* several, angled. *Webera Maingayi*, Hook. fil. Fl. Br. Ind. III. 103.

MALACCA: *Griffith* (K.D.) 3081; *Maingay* (K.D.) 932; *Ridley* 323. PERAK: *King's Collector* 1021, 2526, 4610, 5902, 10754. NEGRI SEMBILAN: *Ridley* 10102. JOHOR: *Ridley* 11169.

Resembling *Pavetta naucleiflora*, Wall., in externals, and varying somewhat as to the amount of the pubescence. *Griffith* No. 3082 (K.D.) seems to be a form of this with the upper surfaces of the leaves almost glabrous and the lower with minute scanty pubescence.

4. *STYLOCORYNA COSTATA*, Miq. Fl. Ind. Bat. Suppl. 218. A tree; young branches as thick as a goose-quill, bluntly 4-angled, rusty-pubescent. *Leaves* thickly membranous, obovate, the apex broad, obtuse, or with an abrupt small apiculus, the base much narrowed; upper surface dark-brown and shining when dry, glabrous; the lower paler, dull, glabrous except for tufts of coarse rusty hair in the axils of the 10 to 12 bold spreading slightly curved main-nerve; length 6 to 8 in.; breadth 3·5 to 4·5 in.; petiole ·6 to ·8 in.; stipules of the stem-leaves not seen, those at the base of the cyme short, broad, blunt. *Cymes* crowded at the apices of the branches, each individual pedunculate, corymbose, densely many-flowered, everywhere minutely and densely pubescent like the flowers and their pedicels, 1 to 1·5 in. in diam., bracteoles minute. *Flowers* ·65 in. long; the calyx about ·15 in. long, campanulate, bluntly 5-lobed. *Corolla-tube* narrowly cylindric, twice as long as the blunt oblong lobes of the limb. *Fruit* the size of a small pea, glabrous, many-seeded. *Webera costata*, Hook. fil. in Fl. Br. Ind. III. 103.

MALACCA: *Griffith* (K.D.) 2791; *Maingay* (K.D.) 945. SELANGOR: *Curtis* 2345.—DISTRIB. Sumatra.

Closely allied to *S. fragrans*, but arboreous and with obovate leaves.

5. *STYLOCORYNA FRAGRANS*, Blume Bijdr. 982. A shrub or small tree; young branches 4-angled, sparsely and deciduously strigose, thinner than a goose-quill. *Leaves* thin, coriaceous, elliptic (often narrowly so),

elliptic-oblong, or oblanceolate, acute or shortly acuminate, the base cuneate; both surfaces olivaceous-brown when dry, (the lower paler), glabrous except for a few stout hairs on the midrib and sometimes also on the 6 to 12 pairs of curved ascending slightly prominent main-nerves; length 3 to 7 in.; breadth 1.25 to 2.5 in.; petiole .2 to .5 in.; stipules ovate-lanceolate, acuminate, shorter than the petioles, deciduous; those of the inflorescence permanent, the uppermost often linear. *Cymes* terminal, corymbose, many-flowered, shortly pedunculate, 2 to 4 in. in diam., often several together, the short branches, flower-pedicels, and calyces hispidulous, puberulous, or sub-glabrous. *Flowers* 1 in. long. *Calyx* campanulate-urceolate, only .15 in. long; its lobes sub-erect, oblong, blunt. *Corolla* densely adpressed-pubescent outside; the tube cylindrical, .7 in. long, the limb clavate in bud, its 5 lobes short, oblong or sub-spathulate, blunt, .2 in. long. *Style* much exerted. *Fruit* pisiform, glabrous, the scar of the calyx small. DC. Prod. IV. 377. *S. laxiflora*, Blume Bijdr. 983; DC. Prod. IV. 377. *S. lucida*, Miq. Fl. Ind. Bat. Suppl. 541. *Rondeletia lucida*, Wall. Cat. 8453. *Ceriscus fragrans*, Nees in Flora, 1825, 116. *Wahlenbergia fragrans*, Blume Cat. Hort. Bot. Brit. 13. *Webera fragrans*, Hook. fil. Fl. Br. Ind. III. 103. *Tarenna fragrans*, Koord. & Valet. Bijdr. 8, p. 77.

In all the provinces; common.—DISTRIB. Malay Archipelago.

6. *STYLOCORYNA MOLLIS*, Wall. Cat. 8454. A small tree; young branches thinner than a goose-quill, 4-angled, rusty pilose. *Leaves* thickly membranous, oblong-oblanceolate or oblong-obovate, or elliptic, acute or shortly acuminate, much narrowed at the base; upper surface dark-brown when dry, sparsely and minutely hispidulous; lower surface paler brown rusty- or tawny-pubescent especially on the midrib and 10 to 12 pairs of stout curved spreading main-nerves; length 4.5 to 6.5 in.; breadth 1.75 to 2.75, petioles .3 to .5 in.; stipules ovate-lanceolate, acuminate hooked, about as long as or longer than the petioles, deciduous, those of the inflorescence larger (.75 in. long) and persistent. *Cymes* terminal, corymbose, pedunculate, shorter than the leaves, many-flowered, spreading, 1.5 to 3 in. in diam., sometimes in fascicles of 2 or 3; branches, flower-pedicels and calyces rusty-hispid. *Flowers* .5 or .6 in. long (excluding the style). *Calyx* .1 in. long, campanulate, the limb with 5 broad oblong blunt lobes as long as the tube. *Corolla* cylindrical, slightly tapering to the base, minutely adpressed-pubescent, more than twice as long as the 5 oblong blunt lobes. *Style* much exerted. *Fruit* the size of a small pea, glabrous, many-seeded. *Webera mollis*, Hook. fil. Fl. Br. Ind. III. 104.

SINGAPORE: *Wallich*; *Ridley* 4915, 5678; *Cantlay* 76. PENANG: *Main-gay* (K.D.) 894; *Curtis* 745, 9362; *King's Collector* 1336. JOHOR: *Ridley*

4171. PERAK: Wray 1276, 2994; King's Collector 2955, 5725, 6589.—
DISTRIB. Sumatra.

25. *RANDIA*, Linn.

Shrubs or trees, unarmed or with axillary or supra-axillary spines. *Leaves* usually coriaceous, sometimes one of a pair larger than the other or absent; stipules short, free or connate. *Flowers* in axillary or (where one leaf of a pair has aborted) leaf-opposed cymes, or solitary or in fascicles or corymbs, rarely terminal, usually white or yellowish. *Calyx-tube* ovoid, obovoid, or turbinate, smooth or ribbed; the limb often tubular, truncate or variously lobed. *Corolla* funnel- or salver-shaped or campanulate, the throat glabrous or hairy; limb with usually not more than 5 short or long lobes twisted in bud. *Stamens* 5; anthers narrow with short filaments or sessile. *Disk* annular or cushion-like. *Ovary* 2- rarely 4-celled; style usually stout sub-fusiform; stigma usually fusiform or clavate, entire or bifid; ovules usually numerous, sunk in placentas attached to the septum. *Fruit* more or less baccate, ovate, ellipsoid or globose, 2-celled, many-seeded. *Seeds* usually immersed in pulp; testa thin, albumen horny, cotyledons orbicular.—DISTRIB. Species about 90, all tropical.

Flowers under '5 in. long, in small fascicles or cymes less than 1 in. in diam., or solitary; corolla with a very short tube, almost rotate; leaves of the pairs equal in size:—

Armed erect shrubs with stout straight spines.

Flowers '4 in. long, solitary or in fascicles of 2 or 3 ... 1. *R. dumetorum*.

Unarmed:—

Erect or scandent; flowers '5 in. long, tube short, lobes long, calyx 4-toothed; corolla 4-lobed, its tube hairy within; anthers linear, sessile; ovary with 4 placentas; fruit not ridged; main-nerves of leaves 10 to 12 pairs

2. *R. binata*.

Scandent; flowers '3 to '35 in. long; calyx 5- or 6-toothed; corolla 5- or 6-toothed, its tube glabrous within; anthers broadly ovate, apiculate with filaments as long as themselves; ovary with 2 placentas; fruit with 10 to 12 vertical ridges; main-nerves of leaves 7 or 8 pairs ...

3. *R. impressinervis*.

Flowers under 1 in. long, in short much-branched many-flowered cymes from the axils of fallen leaves; corolla salver-shaped; leaves of the pairs equal in size; fruit like a pepper-corn (unknown in No. 6):—

Scandent, glabrous:—

Unarmed:—

Leaves on short petioles or sub-sessile, their bases slightly oblique and auricled, main-nerves 6 to 8

- pairs; flowers '4 or '5 in. long; calyx truncate, entire or minutely 5-toothed 4. *R. auriculata.*
 Leaves on petioles '5 or '6 in. long, narrowed and slightly oblique at the base but not auricled; main-nerves 5 to 7 pairs; flowers nearly 1 in. long; calyx minutely 5-toothed 5. *R. Forbesii.*
- Armed:—
 Leaves on petioles '3 to '5 in. long, cuneate at the base; main-nerves 7 to 11 pairs, very bold beneath; flowers '75 in. long; calyx with 5 triangular teeth 6. *R. Curtisii.*
 Trees or large shrubs; leaves on petioles '2 to '3 in. long, not obovate, cuneate but not oblique at the base; main-nerves 7 to 9 pairs; flowers '4 in. long; anthers as long as the corolla-lobes, exserted. 7. *R. densiflora.*
 Flowers '75 to 1 in. long, cylindric, coriaceous; leaves of the pairs unequal in size, obovate or oblanceolate, with 10 to 14 pairs of main-nerves; cymes very condensed, many-flowered; fruit large, (1 in. or more in diam.) more or less compressed:—
 Leaves tomentose beneath; cymes rusty-tomentose everywhere 8. *R. anisophylla.*
 Leaves glabrous except the midrib and main-nerves beneath; cymes puberulous everywhere ... 9. *R. Scortechinii.*
 Flowers about 1 in. long, axillary, solitary or in pairs, shrubs with straight spines and glabrous thinly coriaceous equal leaves with 6 or 7 pairs of main-nerves; calyx tubular '35 in. long with 5 minute triangular teeth; fruit nearly 2 in. in diam. 10. *R. perakensis.*
 Flowers 1'5 to 3 in. long, salver-shaped:—
 Leaves pubescent on the nerves beneath:—
 Shrubs with slender straight spines; calyx '35 in. long, its lobes 5, long, subulate, persisting on the fruit 11. *R. fusciculata.*
 Leaves glabrous:—
 Shrubs erect or sub-scandent with stout recurved spines; calyx '25 in. long, its lobes lanceolate acuminate, not persisting in the fruit 12. *R. longiflora.*
 Unarmed; leaves thickly coriaceous, 4 to 6 in. long, and 1'75 to 2'25 in. broad; calyx about '9 in. long, corolla-tube about 1 in. long, both coriaceous, throat glabrous, limb 1'5 in. in diam.; anthers included, not apiculate, lobes of stigma short, broad 13. *R. Clarkei.*
 Unarmed; leaves thinly coriaceous, 3'5 to 4'5 in. long and 1'5 to 2'5 in. broad; calyx about 4 in. long; corolla about 1 in. long, its throat pubescent; limb 1 to 1'25 in. across; anthers with a dark-coloured apical appendage; lobes of stigma spatulate, reflexed 14. *R. penangiana.*

Flowers 2 to 8 in. long, the corolla with a short cylindrical tube and inflated funnel-shaped limb; fruit ovoid-globular	... ..	15. <i>R. exaltata.</i>
Flowers 4 to 5 in. long, funnel-shaped, 4 in. wide at the mouth; fruit narrowly ellipsoid crowned by the long narrow calyx-teeth	... ..	16. <i>R. macrophylla.</i>
Imperfectly known species	... ..	17. <i>R. Kunstleri.</i>

1. *RANDIA DUMETORUM*, Lam. Ill. t. 156, f. 4. A shrub or small tree, unarmed or with straight horizontal opposite axillary or slightly supra-axillary spines on the thin sub-quadrangular pale puberulous young branches. *Leaves* membranous, oblong, oblong-oblongeolate or obovate-lanceolate, acute or sub-acute, narrowed to the base, both surfaces glabrous, only the midrib always hairy and sometimes also the 6 or 7 pairs of spreading faint main-nerves; length 1.5 to 3.5 in.; breadth .6 to 1.25 in.; petioles .1 in. or less long; stipules ovate, acuminate. *Flowers* .4 in. long, 1 to 3 together on a short minutely bracteolate peduncle, sub-sessile. *Calyx* cylindrical-campanulate, strigose outside; the mouth with 5 broad erect lobes varying from ovate to spatulate, often acute at the apex. *Corolla* with a short wide tube constricted and hirsute below the wide broadly 5-lobed limb. *Anthers* linear, sub-sessile, included within the villos throat. *Style* thick, stigma with 2 thick, short lobes hardly exerted. *Fruit* globose or ovoid, obscurely ribbed, .75 to 1.5 in. long, glabrous or pubescent, smooth, or obscurely ribbed, yellowish; the pericarp thick. *Seeds* numerous, small, oval, compressed, embedded in pulp. W. & A. Prod. 397; Wight Ic. 580; Brand. For. Flora 273; Miq. Fl. Ind. Bat. II. 226; Koord. & Valet. Bijdr. VIII. 96; Hook. fil. Fl. Br. Ind. III. 110. *R. nutans*, *longispina*, DC. and W. & A., Kurz For. Fl. Burm. II. 45; Wight Ic. 581, 582, 583; Miq. l.c. 227. *R. Rottleri*, W. & A. l.c. *R. stipulosa*, Miq. Fl. Ind. Bat. II. 228. *R. spinosa*, Blume Bijdr. 981. *R. malabarica*, Wall. Cat. 8255E. *Gardenia nutans*, Roxb. Hort. Beng. 15; Wall. Cat. 8290. *G. spinosa*, Linn. fil. *G. longispina* and *floribunda*, Roxb. *G. dumetorum*, Retz. Roxb. Corom. pl. t. 136; Wall. Cat. 8259. *G. glabra* and *G. propinqua*, Br. in Wall. Cat. 8258, 8260. *Posoqueria dumetorum*, *P. nutans*, *P. longispina*, and *P. floribunda*, Roxb. Fl. Ind. I. 713 to 719.

LANGKAWI: *Curtis* 2799. KEDAH: *Curtis* 2585. PERAK: *Wray* 2599; *King's Collector* 3168, 6495; *Scortechini* 95, 98, 175, 1017, 1933.—DIS-TRIB. Java; Sumatra; British India.

VAR. *pubescens*, King & Gamble. *Leaves* more or less densely pubescent on both surfaces; spines sometimes .65 in. long; fruit obpyriform.

KEDAH: *Curtis* 2585. LANGKAWI: *Curtis* 2799.

2. *RANDIA BINATA*, King & Gamble n. sp. A shrub occasionally scandent, glabrous, unarmed; young branches thicker than a crow-quill,

angled, pale-brown or cinereous when dry. *Leaves* coriaceous, oblong-elliptic, gradually but rather bluntly acuminate, rounded and somewhat unequal-sided or narrowed; both surfaces dull-brown when dry, opaque, the midrib very prominent on the lower surface; main-nerves 10 to 12 pairs, curved, spreading, more prominent on the lower than on the upper surface; length 6 to 9 in.; breadth 2 to 2.75 in.; petioles .1 in. or less; stipules triangular, keeled, acute, about as long as the petioles, sometimes forming a connate 4-toothed tube. *Flowers* about .5 in. long; their pedicels about .3 in., collected in fascicles on tubercle-like, very shortly branched, minutely bracteolate cymes in the axils of fallen leaves. *Calyx* narrowly campanulate, constricted about the middle; the mouth truncate but with 4 minute sharp teeth. *Corolla* slightly longer than the calyx, salver-shaped; the tube cylindric, hairy within, shorter than the 4 oblong obtuse spreading lobes of the limb. *Anthers* linear, sessile, exserted. *Stigma* exserted, with 2 ovate-oblong spreading thick lobes. *Ovary* 2-celled, with numerous ovules on 4 placentas. *Fruit* the size and shape of a pepper-corn, smooth; seeds numerous, triangular, somewhat compressed; the testa pitted, shining, pale-brown.

PERAK: Wray 2134; King's Collector 4007, 5620, 5631, 7504.

3. *RANDIA IMPRESSINERVIS*, King & Gamble n. sp. A climber; young branches twice as thick as a crow-quill, dark-brown, minutely pubescent. *Leaves* subsessile, coriaceous, elliptic-oblong or elliptic, shortly acuminate, somewhat narrowed to the rounded or acute base; both surfaces brown, the upper tinged with olivaceous and shining, the lower paler, dull; main-nerves 7 or 8 pairs, spreading, curved, and interarching at some distance from the edge, depressed on the upper surface and raised on the lower, the veins rather prominent on the lower; length 3.25 to 4.5 in.; breadth 1 to 1.75 in.; petioles under .1 in.; stipules about .15 in. long, broadly triangular at the base with a long acuminate apex, pubescent. *Flowers* .3 to .35 in. long, on pubescent pedicels from .5 to .15 in. long, in short cymes from the axils of fallen leaves, sub-globular and less than 1 in. in diam.; the branches very short, and with small bracteoles. *Calyx* pubescent outside, campanulate; the limb as long as the tube, truncate but with 5 or 6 minute teeth. *Corolla*-tube .125 in. long, glabrous within, the limb longer than the tube with 5 or 6 oblong blunt spreading lobes. *Anthers* broadly ovate, apiculate, exserted, on filaments as long as themselves. *Stigma* exserted, clavate, separating into 2 broad lobes; *ovary* 2-celled with many ovules on 2 placentas. *Fruit* like a small peppercorn, with 10 to 12 vertical ridges, glabrous; seeds compressed, triangular, grooved.

PERAK: Wray 2158; Scortechini 254; King's Collector 3336, 4894 10399, 10821.—DISTRIB. Borneo, *Haviland* 1895, 2969.

4. *RANDIA AURICULATA*, K. Schumann in Engl. Pflanzenfam. Teil. IV. Abt. 4, p. 75. Scandent, sometimes shrubby, glabrous, unarmed; young branches thinner than a goose-quill, compressed, dark-brown. *Leaves* coriaceous, brown when dry, elliptic, elliptic-oblong or oblong, subacute or obtuse; the base slightly oblique, somewhat auricled; upper surface shining, the lower dull and usually paler; main-nerves 6 to 8 pairs, spreading, slightly curved, thin but prominent on the lower surface; length 4 to 6.5 in.; breadth 1.5 to 3.5 in.; petioles .05 to .15 in.; stipules triangular acuminate, slightly longer than the petiole, deciduous. *Cymes* from the axils of fallen leaves or terminal, pedunculate, trichotomous, from 2 to 4 in. across, many-flowered, puberulous, and with many small triangular persistent bracteoles; the peduncles compressed, from 1 to 1.5 in. long. *Flowers* from .4 to .5 in. long, sub-sessile, almost coriaceous, mostly with a pair of connate minute bracteoles at the base. *Calyx* funnel-shaped, the mouth wide, sub-truncate or minutely 5-toothed. *Corolla* tubular, deeply divided into 6 oblong reflexed lobes twisted in bud; the throat densely pubescent. *Anthers* .2 in. long, linear, with acute tips. *Style* .3 in. long, with 2 free ribbed arms. *Fruit* the size of a peppercorn, its apex crowned at first by the deciduous short calyx, glabrous, 2-celled, with many minute seeds. *Anomanthodia auriculata*, Hook. fil. in Bth. and Hook fil. Gen. Plant. II. 87; Fl. Br. Ind. III. 108. *Webera auriculata*, Wall. in Roxb. Fl. Ind. ed. Carey. & Wall. II. 537. *Stylocoryna auriculata*, Wall. Cat. 8402. *Cupia auriculata*, DC. Prod. IV. 394. *Pseudixora? auriculata*, Miq. Fl. Ind. Bat. II. 210. *Psychotria? auriculata*, Wall. Cat. 8338. *Randia corymbosa*, Benth. MSS. (name only) Koord. & Valet. Bijdr. VIII. 88.

In all the provinces common.—DISTRIB. Malayan Archipelago.

In inflorescence this closely resembles *R. densiflora*.

5. *RANDIA FORBESII*, King & Gamble n. sp. A large climber 60 to 80 feet long, all parts except the branches of the cyme and the outside of the calyx glabrous; young branches twice as thick as a crow-quill, dark when dry; unarmed. *Leaves* coriaceous, elliptic to ovate, acute or shortly acuminate, narrow and slightly oblique but not auriculate at the base; both surfaces brown when dry, the lower paler; main-nerves 5 to 7 pairs, spreading, prominent on the lower surface, depressed on the upper; length 4.5 to 7 in.; breadth 2 to 3 in.; petioles .5 to .6 in., rather slender; stipules triangular-subulate, .2 in. long. *Cymes* from the axils of fallen leaves, pedunculate, about half as long as the leaves, many-flowered; the branches spreading and puberulous, 3 or 4 in. in diam.; bracteoles minute, ovate, acute, lanceolate, persistent; peduncle .75 to 1 in. long. *Flowers* nearly 1 in. long, on short pedicels often bracteolate at the base. *Calyx* tubular, slightly widened at

the minutely and acutely 5-toothed mouth, puberulous outside, .25 in. long. *Corolla* salver-shaped, about 3 times as long as the calyx; the tube narrow; the limb with 5 rather blunt oblong lobes twisted in bud. *Stamens* 5 linear, notched at the apex, included in the tube and slightly longer than its lobes. *Style* half as long as the corolla, slender, the stigmatic lobes thick, reflexed. *Fruit* like a pepper-corn, glabrous, surmounted by the scar of the deciduous calyx, many-seeded.

PENANG: *Curtis* 818. SINGAPORE: *Ridley* 3664, 5662. PERAK: *Scortechini* 1308; *King's Collector* 8273, 10001.—DISTRIB. Lampongs, Sumatra, *Forbes* 1659; Andaman Islands, *King's Collector*.

6. *RANDIA CURTISII*, King & Gamble n. sp. A large climber, all parts except the calyx and flower-pedicels glabrous; young branches thinner than a goose-quill, pale-brown when dry, armed; the spines in pairs, recurved. *Leaves* varying much in size, coriaceous, oblong-elliptic, acute or shortly acuminate, the base cuneate, upper surface brown when dry, the lower pale olivaceous; main-nerves 6 to 11 pairs, rather straight, curving upwards and inter-arching rather far from the edge, very bold on the lower surface, somewhat depressed on the upper, as is the midrib; reticulations wide, obsolete on the upper surface, rather prominent on the lower; length 4.5 to 7 in.; breadth 1.5 to 2.25 in.; petioles .3 to .5 in.; stipules triangular, acuminate, shorter than the petioles, deciduous. *Cymes* from the axils of fallen leaves or terminal, shortly pedunculate, spreading, from 1 to 2 in. long, branching from the base; branches spreading and bearing many boat-shaped minute ovate-acute glabrous bracts; the large cymes 1.5 to 2 in. in diam. and many-flowered, the smaller little-branched and few-flowered. *Flowers* .75 to 1 in. long, on pubescent pedicels .1 to .4 in. long. *Calyx* narrowly tubular-campanulate, adpressed-pubescent outside; the mouth with 5 triangular acute teeth. *Corolla* white, salver-shaped, glabrous outside, tube narrow; limb with 5 oblong-elliptic, blunt or acute spreading lobes; throat and tube inside pubescent. *Anthers* exerted, linear, about as long as the corolla-lobes. *Style* stout; stigma clavate, 2-lobed.

PENANG: *Curtis* 3590. PERAK: *Wray* 2611; *King's Collector* 3305, 4882, 6507, 6814, 8480.

7. *RANDIA DENSIFLORA*, Benth. *Flora Hongkong* 155. A glabrous tree, often as high as 60 feet; young branches thinner than a goose-quill, pale-brown, 4-angled. *Leaves* coriaceous, elliptic-oblong to oblong-lanceolate, acute or subacute, rarely acuminate, the base cuneate; both surfaces brown when dry, tinged with olivaceous, the lower usually paler; main-nerves 8 or 9 pairs, rather straight, ascending, thin but prominent on the lower surface, slightly depressed on the upper; length

4 to 6 in.; breadth 1.75 to 2.75 in.; petioles .25 to .3 in.; stipules triangular, acuminate, shorter than the petioles, caducous. *Cymes* from the axils of fallen leaves, many-flowered, almost sessile, much branched from near the base, 2 to 4 in. in diam., the branches puberulous, spreading and bearing many acute persistent bracteoles. *Flowers* .4 in. long, on pedicels equalling or exceeding the calyx. *Calyx* tubular-campanulate, about .1 in. long, the mouth with 5 minute acute teeth. *Corolla* with a short tube hairy on the throat inside; the limb with 5 oblong blunt minutely cuspidate reflexed lobes equalling in length the 5 linear exerted *anthers*; filaments dorsifixed. *Style* much exerted, stigma fusiform. *Fruit* like a pepper-corn. Hook. fil. Fl. Br. Ind. III. 112. Koord. & Valet. Bijdr. VIII. 93. *Webera densiflora*, Wall. in Roxb. Fl. Ind. III. ed. Carey & Wall. II. 536. *W. oppositiflora*, Roxb. Fl. Ind. I. 698; Kurz For. Fl. Burm. II. 47. *Stylocoryna densiflora*, Wall. Cat. 8404 excl. A. Miq. in Ann. Mus. Lugd. Bat. IV. 128, t. 5 A. *S. dimorphophylla*, Teysm. & Binn. Pl. Nov. Hort. Bog. 4. *Cupia densiflora* and *C. oppositiflora*, DC. Prod. IV. 394. *Gnopachis axilliflora* and *G. oblongata*, Miq. Fl. Ind. Bot. II. 221. *Urophyllum coriaceum*, Miq. l.c. Suppl. 542. *Iwora Thozetia*, F. Mull. Fragm. II. 132. *Psychotria*, sp. Wall. Cat. 8332. *Rubiacea*, Wall. Cat. 8455, 8456, 8465.

Common in all the provinces.—DISTRIB. Malayan Archipelago; Hongkong; North Australia.

VAR. *parvifolia*, King & Gamble. *Leaves* narrowly oblong-elliptic, 3 to 5 in. long and 1.25 to 2.75 in. broad; petioles .15 to .2 in.

PENANG: *Curtis* 796; *Ridley* 10243. PERAK: *Scortechini* 811, *King's Collector* 1585.

8. *RANDIA ANISOPHYLLA*, Jack in Roxb. Fl. Ind. ed. Carey and Wall. II. 561. A small unarmed tree; young branches at first rusty-tomentose but soon sub-glabrous, pale, and striate, as thick as a goose-quill. *Leaves* of each pair unequal, coriaceous, obovate-elliptic, shortly cuspidate, much narrowed from the middle to the base; upper surface dark-brown when dry, glabrous except the shortly tomentose depressed midrib and nerves; lower surface paler, tomentose on the midrib, pubescent especially on the transverse veins and on the 10 to 14 pairs of bold spreading main-nerves; length of the longer of each pair 8 to 10 in., of the smaller 3 to 6 in.; breadth of the longer 3 to 5 in., of the smaller 1.5 to 3 in.; petioles .3 to 1 in., tomentose, stipules lanceolate, acuminate, tomentose, as long as petioles. *Cymes* pedunculate, rusty-tomentose everywhere, crowded, spreading, 1.5 to 2 in. in diam. with numerous lanceolate acuminate bracteoles .2 to .25 in. long; the peduncles about as long as the leaf-petioles. *Flowers* coriaceous, .75 in. long, on short pedicels or sub-sessile. *Calyx* tubular-campanulate, with 5 acute lobes or

teeth. *Corolla* longer than the calyx, tubular, its lobes oblong. *Anthers* linear, sub-sessile near the base of the tube. *Style* fusiform. *Fruit* 1 to 1.5 in. long, bluntly ellipsoid, somewhat compressed, minutely tomentose, crowned by the rather large tubular calyx. Hook. fil. Fl. Br. Ind. III. 114; DC. Prod. IV. 381. *Gardenia anisophylla*, Jack, Miq. Fl. Ind. Bat. II. 230. *G.?* *anisophylla*, Wall. Cat. 8399 A.

PENANG: *Jack & Porter*; *Wallich* 8284 D.; *Curtis* 164; *Hullett* 162. MALACCA: *Derry* 27. SINGAPORE: *King's Collector* 1234.—DISTRIB. Sumatra, *Forbes* 2954, 3088.

A Bornean species, represented in Herb. Kew. by Beccari's 760 and Haviland's 3420, is allied to this, but its calyx has long teeth and much woolly hair. It is evidently undescribed and might be named *R. Beccarii*.

9. *RANDIA SCORTECHINII*, King & Gamble n. sp. An armed tree 20 to 60 feet high; young branches usually thicker than a goose-quill, glabrous, the bark pale when dry. *Leaves* of the pairs not very unequal, membranous, obovate-elliptic to oblanceolate-elliptic, obtuse or abruptly acute or minutely cuspidate, much narrowed from above the middle into the glabrous petiole; both surfaces brown when dry, rarely tinged with green and both glabrous except for a few scattered hairs on the nerves on the lower; main-nerves 14 to 18 pairs, little-curved, spreading, prominent on the lower surface, rather faint as the upper, veins on the lower prominent, transverse, wavy; length of the larger leaf of the pair 8 to 16 in.; breadth 4 to 6 in.; length of the smaller leaf 5 to 8 in.; breadth 3 or 4 in.; petioles .75 to 1.5 in.; stipules ovate, connate by their bases. *Cymes* pedunculate, leaf-opposed (from the fall of the subtending leaf), many-flowered, much-branched, spreading, 2 to 2.5 in. in diam., everywhere puberulous; bracteoles numerous, broadly triangular, persistent; peduncles .75 to 1 in. long. *Flowers* about 1 in. long, puberulous everywhere. *Calyx* tubular, the mouth truncate but usually with 5 small teeth. *Corolla* cylindric, .75 in. long, with 5 short lobes. *Anthers* linear, nearly half as long as the corolla, dorsifixed and inserted near its base. *Ovary* two-celled, each cell multi-ovulate. *Style* short, stigma clavate, sulcate. *Fruit* sub-globular, somewhat compressed, densely puberulous, about 1 in. in diam., crowned by the short calyx-tube.

PERAK: *Scortechini* 574, 170; *Wray* 3031, 187, 3212, 1381; *King's Collector* 3455, 3696, 7205, 4485, 6786, 10131. SINGAPORE and PENANG: *Curtis* 164.—DISTRIB. Borneo, *Beccari* 2599; *Haviland* 84, 697, 2161.

10. *RANDIA PERAKENSIS*, King & Gamble n. sp. A small armed glabrous tree 12 to 18 feet high; young branches thinner than a quill, pale cinereous, glabrous, often armed with stout flower-bearing spines 1 to 1.25 in. long. *Leaves* thinly coriaceous, narrowly elliptic, tapering to each end, the apex bluntly acuminate; both surfaces

brown, the lower paler; upper surface dark-brown when dry, the nerves invisible; the lower pale-brown, the main-nerves 6 or 7 pairs, very distinct, curved, interarching at some distance from the edge, the reticulations rather distinct; length 3 to 5 in.; breadth 1·4 to 2 in.; petioles ·1 to ·2 in.; stipules triangular, acuminate. *Flowers* 1 in. long, on very short pedicels, solitary or in pairs from short branches which ultimately become spines. *Calyx* tubular, ·35 in. long, contracted at the base, the mouth with 5 narrowly triangular short teeth. *Corolla* salver-shaped; the tube ·45 in. long and nearly ·2 in. wide, the limb ·75 in. across with 5 or 6 oblong blunt lobes. *Anthers* linear, subsessile at the base of the tube, about ·3 in. long. *Style* short, stout, shorter than the cylindrical stigma. *Fruit* globular, smooth, surmounted by the short scar of the calyx, 1·75 in. in diam.; pericarp very thick; *seeds* ellipsoid, compressed, ·25 in. long.

PERAK: *King's Collector* 7450, 8356.

11. *RANDIA FASCICULATA*, DC. Prod. IV. 386. A much-branched armed shrub; young branches thicker than a crow-quill, rough from small tubercles and softly and minutely pubescent. *Leaves* membranous, lanceolate, ovate or oblong-lanceolate, shortly acuminate (often bluntly so), rounded or cuneate at the base; both surfaces olivaceous, the upper usually glabrous or nearly so, the lower paler, minutely pubescent usually on the midrib and nerves only but sometimes on the spaces between; main-nerves 4 to 6 pairs, slightly curved, ascending, distinct on the lower surface, almost obsolete on the upper; length ·75 to 3 in.; breadth ·5 to 1·5 in.; petioles ·05 to ·2 in., pubescent; stipules broadly triangular, much acuminate, about as long as the petioles; spines axillary, slender, straight, ascending, slightly longer than the petioles, (sometimes absent). *Flowers* 1·5 to 2 in. long, axillary (under 1 in. in var. *parviflora*) solitary or in fascicles of 2 or 3, bracteoles lanceolate, acuminate, hairy. *Calyx* ·35 in. long; the tube narrowly funnel-shaped, villous, the mouth with 5 narrow subulate teeth as long as the tube. *Corolla* salver-shaped, the tube nearly 1 in. long, about ·05 in. in diam., glabrous outside, pubescent inside; limb nearly 1 in. across with 5 deep elliptic to oblong-elliptic, obtuse or sub-acute lobes. *Anthers* half-exserted from the throat, linear, not apiculate, ·3 in. long. *Style* slender; stigma exserted, with 2 short broad ovate blunt lobes. *Fruit* pisiform, 2-celled, 4-seeded, sparsely pubescent, crowned by the long-toothed calyx-tube. Brandis For. Flora 273; Hook. fil. Fl. Br. Ind. III. 109. *R. rigida*, DC. l.c. *R. malabarica*, Wall. Cat. 8255 A. B. C. D. *Gardenia fasciculata*, Roxb. Hort. Beng. 15. *G. rigida* and *G. parviflora*, Wall. Cat. 8257 A. B. *Posoqueria fasciculata*, Roxb. Fl. Ind. 1717. *P. rigida*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 570. *Webera fasciculata*, Kurz For. Flora Burm. II. 49.

KEDAH: *Curtis* 2549. PENANG: *Curtis* 718, 1498. PROV. WELLESLEY: *Curtis* 7106. PERAK: *Scortechini* 1802; *Wray* 3467.

VAR. *parviflora*; tube of corolla only about .75 in. long, very narrow; the limb .75 in. in diam.

LANGKAWI: *Curtis* 3383.

Roxburgh's unpublished figures of *Posoqueria fasciculata* and *Gardenia rigida* are practically alike. The only differences are that the leaves of the former are depicted as ovate-lanceolate and 2.25 to 3 in. long; the limb of the corolla as yellow, its tube as .75 in. long and white; the calyx under .2 in. long with teeth one quarter of its length; while *Randia rigida* is shown as having ovate leaves only 1.5 in. long; corolla-limb white and the tube 1 in. long, also white; the calyx .3 in. long with filiform teeth half as long as the tube. The former he attributes to Nepal, the latter to Singapore. The two are evidently forms of the same widely distributed species.

12. *RANDIA LONGIFLORA*, Lam. Dict. II. 227; Ill. t. 156, f. 3. A glabrous shrub, sometimes scandent, usually armed; young branches twice as thick as a crow-quill, or thicker, pale-brown, shining, usually bearing stout curved axillary spines .3 in. or more in length. *Leaves* coriaceous, oblong, oblong-lanceolate or obovate-elliptic, acute or shortly cuspidate, the base cuneate; both surfaces pale-olivaceous green when dry, dull; main-nerve 5 or 6 pairs, rather straight, ascending, faint on both surfaces but especially on the upper; length 1.5 to 3.75 in.; breadth .75 to 1.75 in. (larger in var.); petioles .1 to .15 in.; stipules about as long as the petioles, broadly triangular, with abrupt acuminate apices. *Cymes* terminal or axillary, umbellate, as long as or longer than the leaves (shorter in var.), few-flowered, on peduncles .25 to .4 in. long; bracteoles few, ovate, acute. *Flowers* 1.5 (rarely 2 in.) long, white; their pedicels from .25 to .4 in., bracteolate about the middle. *Calyx* narrowly infundibuliform, .25 in. long (.5 in. in var.) the mouth with 5 lanceolate acuminate teeth. *Corolla* salver-shaped, tube .75 to 1.5 long and less than 1 in. wide; the throat pubescent; the limb 1 in. or more across with 5 oblong blunt spreading or reflexed lobes. *Anthers* linear, reflexed, exserted, much shorter than the corolla-lobes. *Style* filiform; stigma broadly clavate, exserted, separating into 2 spatulate lobes. *Fruit* globose-ovoid, glabrous, .35 to .5 in. long, its stalk somewhat longer; calyx-scar truncate, conspicuous; seeds rugose, embedded in pulp. DC. Prod. IV. 386; Hook. fil. Fl. Br. Ind. III. 111 (in part). *R. scandens*, DC. l.c. 387. *Posoqueria longiflora*, Roxb. Fl. Ind. I. 718. *Webera scandens*, Roxb. l.c. I. 698. *W. longiflora*, Kurz, For, Flora Burm. II. 48. *Canthium recurvum*, Wall. Cat. 8284 (all the sheets except D.) in Herb. Linn. Soc.

MALACCA: *Griffith* (K.D.) 2802, 2803, 2805, 2807. *Maingay* (K.D.)

900. SINGAPORE: *Lobb*; *Schomburg* 59; *Ridley* 2415, 9487. PERAK: *Wray* 2507; *King's Collector* 308, 5231; *Hullett* 93.—DISTRIB. Borneo.

Except that it has spines the plant here described agrees in all respects with Roxburgh's *Webera scandens* of which he has left a coloured drawing in the Calcutta Herbarium. Roxburgh's figure and description of his *Posoqeria longiflora* also agree with this, except in being arboreous. Lamarck's figure of *R. longiflora* agrees with Roxburgh's except in having smaller leaves.

VAR. *major*, King & Gamble; young branches sometimes nearly as thick as a goose-quill, leaves 4 to 6 in. long and 1.75 to 3 in. broad; cymes shorter than the leaves; calyx .5 in long.

PUNGAH: *Curtis*.—DISTRIB. Burma, *Helper* (K.D.) 2906; *McClelland*; Andaman Islands, *King's Collector*.

13. *RANDIA CLARKEI*, King & Gamble n. sp. Quite glabrous: young branches thinner than a goose-quill, pale-brown when dry. *Leaves* thickly coriaceous, oblong-elliptic, subacute, the base rounded or slightly cuneate, both surfaces dark-brown when dry, the lower slightly olivaceous, the midrib on both thick and the 4 or 5 pairs of slightly curved ascending main-nerves faint; length 4 to 6.5 in., breadth 1.75 to 2.5 in.; petioles .5 to .6 in., thick. *Cymes* in the axils of fallen leaves or terminal, 3- or 4-flowered, the bracts broadly ovate, acute, persistent. *Flowers* 2.5 to 3 in. long, coriaceous. *Calyx* narrowly funnel-shaped, tapering much towards the base, about .9 in long; the mouth with 5 small acute triangular teeth. *Corolla* salver-shaped, the tube 1 in. long and .15 in. in diam.; its throat glabrous; the limb 1.5 in. across, deeply divided into 5 ovate-lanceolate, spreading lobes. *Anthers* sessile, included in the tube, linear, .3 in. long. *Style* as long as the corolla-tube; stigma exerted, short, thick, separating into 2 broad lobes. *Canthium recurvum*, Wall. Cat. 8284 D. in Herb. Kew. (not D. in Herb. Linn. Soc.)

MALACCA: *Maingay* (K.D.) 840.

The type sheet of this species was included by Wallich in his *Canthium recurvum*, of which it stands in the Kew set as sheet D. It differs from the other sheets which belong to *Randia longiflora* in its greatly longer calyx and also larger more coriaceous corolla, which has a wider tube, glabrous in the throat as elsewhere, included anthers, and a much shorter stigma which opens out into 2 short broad lobes. The leaves of this are also larger and thicker than those of *R. longiflora*.

14. *RANDIA PENANGIANA*, King & Gamble n. sp. A large glabrous armed climber; young branches twice as thick as a crow-quill, dark coloured when dry, armed with stout axillary recurved spines .3 in. long. *Leaves* thickly membranous, elliptic, sometimes slightly obovate, shortly and bluntly acuminate, the base cuneate, both surfaces brown when dry, the lower somewhat the paler and tinged olivaceous; main-nerves 5 to 7 pairs, rather straight, oblique, faint on both surfaces;

length 3 to 4·5 in.; breadth 1·5 to 2·5 in. petiole ·2 to ·3 in. slender; stipules shorter than the petioles, broadly triangular at the base, much acuminate upwards. *Cymes* terminal or from the axils of fallen leaves, on pedicels about ·2 in. long; the branches short and bearing persistent ovate-acute bracteoles. *Flowers* few, about 2 in. long, on pedicels about 2 in. long. *Calyx* ·4 in. long, tubular, tapering to the base, the mouth with 5 triangular acute short teeth. *Corolla* salver-shaped; the tube 1 in. long and about ·1 in. in diam.; the limb about 1 to 1·25 in. across, deeply divided into 5 broadly elliptic subacute lobes. *Anthers* linear, with a black apical process from the connective, included in the slightly pubescent throat, sessile, dorsifixed, about ·2 in. long. *Style* filiform; stigma somewhat exserted, thick, clavate, opening out into 2 thick spatulate reflexed fleshy lobes. *Fruit* depressed-globular, glabrous, ·5 to ·65 in. in diam. when dry.

PENANG: *Curtis* 927. SINGAPORE: *Hullett*, 114.

The following, of which we have seen no specimens in flower, also probably belong to this species; *viz*: Malacca: *Derry* 1056. Perak: *Scortechini* 1538; *King's Collector* 10171. One of Mr. Curtis's specimens is described as a tree, another as a climber. The leaves are thinner and broader than those of *R. floribunda*, Lam., and the flowers are (especially as regards the limb of the corolla) larger. The calyx although of the same shape is also larger. This species still more nearly resembles *R. Clarkei*, King & Gamble (of which the type is Wall. Cat. 8284 D.) but it has smaller, much less coriaceous leaves, which are broader in proportion to their width. This has also smaller flowers with a very much smaller calyx. From both it differs by its conspicuously apiculate anthers.

15. *RANDIA EXALTATA*, Griff. Notul. IV. 262. A tree 30 to 50 feet high, unarmed; young branches deciduously pubescent, ultimately glabrous, dark-coloured and striate when dry, thinner than a goose-quill. *Leaves* coriaceous, glabrous, oblong-lanceolate, acuminate at base and apex; upper surface dark-brown when dry, not reticulate, the nerves and midrib depressed; lower surface paler, reticulate; main-nerves 8 to 10 pairs, curved, ascending, thin, dark in colour and distinct beneath when dry; length 3·5 to 4·5 in.; breadth 1 to 1·35 in.; petioles ·2 in.; stipules triangular, acuminate, about as long as the petioles and like them rusty-pubescent. *Cymes* in the axils of leaves or of fallen leaves, when in flower half as long as the leaves, adpressed rusty-pubescent; branches few, bearing small persistent acute bracts and 4 to 6 large shortly pedicellate flowers. *Calyx* ·15 in. long, funnel-shaped; densely adpressed-pubescent outside, the mouth truncate but minutely 5-toothed. *Corolla* white, somewhat purplish, 2 in. or more long, rather sparsely adpressed-pubescent outside; the tube narrowly cylindrical, only about ·3 in. long, villous at the throat; the limb widely funnel-shaped, scurfily hairy inside; the mouth with 5 broad subacute lobes ·3 or ·35

in. long. *Anthers* linear, .4 in. long, sessile, dorsifixed above the throat. *Style* filiform 1 in. long, surmounted by the fusiform 2-lobed stigma. *Berry* globular-ovoid, smooth, woody, 2.5 in. in diam., on a thick peduncle .5 in. long. *Seeds* embedded in pulp, compressed, angled, nearly .5 in. broad. Hook. fil. Fl. Br. Ind. III.; Kurz For. Fl. Burma. II. 46 (in part), Koord. & Valet. Bijdr. VIII. 90. *Gardenia pulcherrima*, Kurz in Journ. As Soc. 1877 II. 155; For. Flora Burm. II. 43 (in part). *Gardenia Schoemanni*, Teys. & Binn. in Ned. Kruidk. Arch. III. 403; in Nat. Tijds. II. 201; Miq. Fl. Ind. Bat. II. 232.

PENANG: *Curtis* 793.—DISTRIB. Andaman Islands; Burma (*Griffith* K.D. 2826).

The Andaman plant included under *R. exaltata* by Kurz differs from *Griffith's* in having obovate leaves and a smaller corolla with a long tube.

16. *RANDIA MACROPHYLLA*, Benth. & Hook. fil. Gen. Plant. ex Hook. fil. Fl. Br. Ind. III. 114. An erect unarmed shrub 3 or 4 feet high; young branches thinner than a goose-quill, dark-coloured when dry, scaberulous-puberulous. *Leaves* large, coriaceous, almost sessile, narrowly elliptic-oblong, sometimes shortly acuminate, gradually narrowed to the acute base; upper surface olivaceous-brown when dry, glabrous except sometimes for a few hairs on the midrib; lower darker, usually glabrous, but sometimes sparsely pubescent on midrib and nerves; main-nerves 10 to 14 pairs, slightly curved, ascending, depressed on the upper, prominent on the lower surface; length 8 to 12 in.; breadth 1.75 to 2.75 in.; petioles .1 to .15 in. pubescent, stipules .4 to .5 in. long, triangular, with a broad base and long subulate-acuminate apex. *Flowers* 1 or 2 in a leaf-axil, subsessile, 4.5 to 6 in. long, with many subulate hairy bracts at the base. *Calyx-tube* funnel-shaped, about .35 to .5 in long; the mouth with 5 linear spreading teeth much longer than the tube. *Corolla* 4 to 5 in. long, infundibuliform, 3 or 4 inches wide at the mouth, white or with purple spots, puberulous or subglabrous outside; the limb with 5 ovate sub-acute lobes about 1 in. long. *Anthers* linear, about .8 in. long, included in the glabrous throat. *Style* slender; stigma clavate, nearly as long as and parallel to the anthers. *Fruit* ellipsoid, sparsely and deciduously rusty-strigose, 2.5 in. long, crowned by the long, persistent calyx-lobes. *Rothmannia macrophylla*, R. Br. in Wall. Cat. 8304.

PENANG: *Wallich*, *Curtis* 966. MALACCA: *Griffith* (K.D.) 2822; *Maingay* (K.D.) 944; *Cuming* 2365; *Hervey*, *Derry* 43, 79. SINGAPORE: *Lobb* 65; *Dr. T. Anderson* 107; *H. J. Murton* 1; *Hullett* 117. PERAK: *Wray* 1380, 1632, 3232, 4214; *Scortechini* 1479; *King's Collector* 769, 10356. PENANG: *Curtis* 966; DINDINGS: *Curtis*. SELANGOR: *Gooderoy* 10484.—DISTRIB. Sumatra.

17. *RANDIA KUNSTLERI*, King & Gamble n. sp. A stout glabrous armed climber; young branches thinner than a goose-quill, pale-brown, 4-angled, shining; spines in pairs, slightly curved, slender, much deflexed, about .5 in. long. *Leaves* coriaceous, broadly ovate to elliptic-rotund, obtuse or bluntly and shortly cuspidate; both surfaces pale hepatic-brown when dry; main-nerves 4 or 5 pairs, curved, ascending, rather prominent on both surfaces when dry; length 4 to 5.5 in.; breadth 2.5 to 3.5 in.; petioles .3 to .5 in.; stipules longer than the petioles, oblong, sub-acute. *Flowers* solitary or in scanty cymes, on short pedicels. *Calyx* tubular, the limb truncate but obscurely toothed. *Fruit* deflexed, on a short pedicel, depressed-globular, slightly contracted towards the base, crowned by the short tubular truncate calyx-limb, about 1.25 in. in diam. when dry and somewhat less in length; pulpy; pericarp leathery, smooth, shining. *Seeds* numerous, horizontal, compressed; albumen horny, scanty; radicle longer than the orbicular cotyledons. Wall. Cat. 8284 C. (in Herb. Kew, not in Linn. Soc.)

PERAK: *King's Collector* 2683, 4335; *Scortechini* 485. SUMATRA: *Curtis* 3543.

Scortechini's specimens of this in our hands are not in flower. From the field note on one of them we quote the description of the flower as follows. "*Calyx-tube* .5 in. long, two-thirds being produced beyond the ovary, cylindric, slightly constricted in the middle; the limb with 5 shallow teeth, glabrous outside and inside except for an interrupted ring of yellowish thick hairs at the mouth inside. *Corolla-tube* .5 in. long; the lobes as long, greenish yellow, glabrous except at the throat where are attached the slightly exerted linear *anthers*. *Ovary* 2-celled; each cell with many ovules in several series; stigma oblong, shortly 2-fid. *Berry* 1 in. in diam., not ribbed, crowned by the persistent calyx-tube."

26. *GARDENIA*, Linn.

Shrubs or trees, often armed. *Leaves* opposite, rarely ternate; stipules often connate. *Flowers* often large, terminal or axillary, solitary, fascicled, rarely cymose, sometimes dimorphic and polygamous. *Calyx-tube* campanulate or tubular; the limb variable, tubular or dilated, sometimes spathaceous, often persistent on the fruit. *Corolla* various, longer than the calyx-limb; 5- to 12-lobed; the lobes twisted in bud. *Stamens* as many as the corolla-lobes. *Anthers* linear, included, sessile or sub-sessile on the tube, as many as the corolla-lobes, and alternate with them. *Ovary* 1-celled; style stout; stigma clavate, fusiform or bifid; ovules numerous, 2-seriate on the 2 to 6 placentas. *Fruit* often large, ovoid, ellipsoid or globose, baccate, with a coriaceous epicarp and woody endocarp which sometimes splits vertically at the sutures. *Seeds* numerous, imbedded in the placental pulp, compressed; testa

thin; albumen horny; embryo minute.—DISTRIB. About 60 species, tropical and sub-tropical.

Calyx narrowly campanulate, its lobes long, linear, spreading:—

Corolla-lobes under $\cdot 5$ in. in length, oblong; fruit sub-globular, $\cdot 5$ to $\cdot 75$ in. in diam. ... 1. *G. tentaculata*.

Corolla-lobes $2\cdot 25$ to 4 in. long; fruit ovate-oblong, $2\cdot 5$ in. long ... 2. *G. stenopetala*.

Calyx campanulate, boldly 5-keeled; the mouth expanded, sub-truncate or with 5 large deep keeled lobes; corolla-tube $\cdot 5$ to 1 in. long; fruit ribbed ... 3. *G. carinata*.

Calyx tubular, smooth; fruit smooth:—

Calyx much shorter than the corolla:—

Calyx $\cdot 5$ in. long, the mouth with 5 triangular acuminate keeled teeth; corolla $1\cdot 5$ in. long, widely campanulate suddenly contracted into a cylindrical tube $\cdot 25$ in. long, the lobes of the limb deep, oblong, obtuse ... 4. *G. Godefroyana*.

Calyx $\cdot 4$ to $\cdot 65$ in. long; the mouth truncate, sometimes split on one side; corolla-tube $1\cdot 75$ to $2\cdot 5$ in. long ... 5. *G. tubifera*.

Calyx $\cdot 75$ to $1\cdot 5$ in. long, inflated-tubular, the mouth oblique with a few irregular lobes; corolla-tube $2\cdot 5$ to 3 in. long ... 6. *G. speciosa*.

Calyx 3 to 4 in. in length; nearly as long as the tube of the corolla ... 7. *G. Griffithii*.

1. *GARDENIA TENTACULATA*, Hook. fil. in Fl. Br. Ind. III. 119. An unarmed shrub or small tree; young branches thinner than a goose-quill, sparsely puberulous, dark when dry. *Leaves* membranous, narrowly oblanceolate or lanceolate-oblong, acuminate or caudate-acuminate, much narrowed to the short petiole; both surfaces dark-brown when dry, glabrous, the midrib and 14 to 18 pairs of thin spreading nerves sometimes puberulous on the lower; length 4 to 8 or even 10 in.; breadth $1\cdot 5$ to 3 in.; petiole $\cdot 25$ to $\cdot 4$ in.; stipules tubular below the 2-lobed mouth, slightly longer than the petioles. *Flowers* in fascicles of 4 to 6 (sometimes fewer), from the axils of fallen leaves, about $\cdot 75$ in. long, on stalks from $\cdot 3$ to $\cdot 5$ in. long. *Calyx* $\cdot 5$ in. long, narrowly campanulate, with dilated limb deeply divided into 5 narrow flexuose linear-lanceolate spreading lobes. *Corolla* slightly exceeding the calyx, tubular, glabrous except a pubescent band at the base of the interior of the tube; the mouth with 5 oblong obtuse lobes. *Anthers* 5, linear, sessile, at the base of the corolla-tube, $\cdot 6$ in. long. *Fruit* sub-globular, faintly ridged, glabrous, $\cdot 5$ to $\cdot 75$ in. in diam., crowned by the tentacle-like calyx-lobes. *Seeds* compressed, reticulate.

JOHOR: *Ridley* 11140; *Kelsall* 4082a. MALACCA: *Hervey*; *Maingay* (K.D.) 839; *Griffith* (K.D.) 2810; *Lobb*. PERAK: *Scortechini* 63; *King's Collector* 2691, 7851, 8377; *Wray* 2036. PENANG: *King's Collector* 1639, 2691. PAHANG: *Ridley* 2195.—DISTRIB. Borneo, *Motley* 934; *Beccari*; *Haviland* 2967.

2. *GARDENIA STENOPETALA*, King & Gamble n. sp. A shrub 4 to 8 feet high; young branches as thick as a goose-quill or nearly so, very dark-coloured when dry, covered with deciduous dark pubescence and minute white scales. *Leaves* large, thinly coriaceous, oblong-ob lanceolate or elliptic, shortly acuminate, much narrowed to the short petiole; both surfaces olivaceous-brown when dry and both (but especially the lower) bearing sparse adpressed partly deciduous hairs, the midrib and nerves more densely pubescent; transverse veins on the lower rather distinct, distant; main-nerves 12 to 14 pairs, curved, ascending or spreading, rather bold on the lower surface when dry; length 7 to 14 in.; breadth 2 to 4 in.; petioles .3 to .5 in.; stipules shorter than the petioles, broadly triangular at the base, the apices long-acuminate. *Cymes* from the axils of fallen leaves, 2-branched and 4- to 6-flowered; their peduncles under .3 in. long, with narrowly linear, lanceolate bracts. *Flowers* 2.5 to 5 in. long; their pedicels .3 in., narrowly bracteate and rusty-pilose like the cyme-peduncles and calyx. *Calyx* narrowly campanulate, .4 to .6 in. long, the limb with 5 linear spreading lobes somewhat longer than the tube. *Corolla* with a puberulous cylindric tube about .5 to .75 in. long containing the 5 linear anthers at its base; lobes of the limb 5, narrow, 2.5 to 4.5 in. long and from .15 to .2 in. wide, with valvate inflexed edges, bearing some scattered hairs; *anthers* sessile, .3 in. long. *Style* filiform; stigma fusiform, shortly bifid. *Fruit* ovate-oblong, 2.5 in. long and 1.5 in. in diam., crowned by the persistent hairy calyx; pericarp thin, brittle, smooth; *seeds* ellipsoid, compressed, .3 in. long.

PERAK: *Scortechini* 1446; *King's Collector* 4156, 4265; *Curtis* 1306, 3144.

3. *GARDENIA CARINATA*, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. II. 560. A shrub; young branches as thick as a goose-quill, whitish, glabrous, the cicatrices of fallen leaves prominent. *Leaves* membranous, obovate to oblanceolate, very shortly acuminate or cuspidate, much narrowed to the base; both surfaces brown when dry, the upper shining, glabrous except the midrib; the lower tinged olivaceous, puberulous especially on the stout midrib and 16 to 18 pairs of rather straight spreading stout nerves; length 4 to 7 in.; breadth 2 to 3 in. (sometimes much longer). *Flowers* 1.5 to 2 in. long, axillary, solitary or in pairs on short bracteolate puberulous pedicels. *Calyx*

1 to 1.25 in. long, campanulate, boldly 5-keeled, tapering to the pedicel, the mouth expanded sub-truncate or with 5 large deep-keeled lobes. *Corolla* salver-shaped; the tube .5 to 1 in. long, adpressed-puberulous, ridged; limb 1.25 to 2 in. across, with 6 to 9 broad lobes. *Stigma* broadly clavate. *Fruit* ellipsoid, 5- to 8-ribbed, 1.5 to 1.75 in. long including the large persistent calyx. Wall. Cat. 8271; Hook. fil. Fl. Br. Ind. III. 117. DC. Prod. IV. 380; Miq. Fl. Ind. Bat. II. 229.

PERAK: *Scortechini* 2301. PENANG: *Wallich*, *C. Curtis* 525. MALACCA: *Maingay* 1486, (K.D.) 837; *Ridley* 953, 906. *Hervey*. PROVINCE WELLESLEY: *Ridley* 6974. SINGAPORE: *H. J. Murton*.

4. GARDENIA GODEFROYANA, O. Kuntze in Revis. Gen. Pl. I. 283. Young branches half as thick as a goose-quill, rusty-puberulous, bearing at the nodes the persistent bases of the stipules. *Leaves* thinly coriaceous, dark-coloured when dry, both surfaces glabrous except for a few hairs near the edge and on the midrib, narrowly elliptic, the apex abruptly sub-acute, gradually narrowed to the base; main-nerves 8 to 10 pairs, indistinct on both surfaces; length 1.75 to 2.25 in.; breadth .65 to 1 in.; petiole .15 in.; stipules conjoined into a wide tube longer than the petioles, obliquely cut on one side, the apex acute rusty-pubescent externally. *Flowers* solitary or in pairs, 2 in. long. *Calyx* .5 in. long, infundibuliform; the mouth wide and with 5 short triangular keeled acuminate teeth with ciliate edges. *Corolla* about 1.5 in. long, widely campanulate, abruptly contracted into a cylindrical tube .25 in. long, the limb 1.75 in. wide, divided into 5 deep oblong blunt spreading lobes. *Fruit* ellipsoid, crowned by the thick calyx-scar about an inch long and more than half an inch in diameter. *Seeds* numerous, compressed, surrounded by pulp.

PENANG: *Ridley* 1316.—DISTRIB. Saigon, *Pierre*; Cambodia, *Kuntze*; Cochin-China, *Godefroy-Leboeuf*.

5. GARDENIA TUBIFERA, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 562. An unarmed shrub or tree, young branches nearly as thick as a goose-quill, the bark very pale, glabrous, shining. *Leaves* thinly coriaceous, oblanceolate, the apex broad and shortly cuspidate, the base much narrowed; both surfaces pale olivaceous-brown, shining, usually glabrous, but sometimes the nerves and midrib beneath puberulous or scurfy; main-nerves 10 to 12 pairs, sub-horizontal, thin but distinct especially below; length 3 to 6 in.; breadth 1.5 to 2 in.; petiole .2 to .4 in., narrowly winged in its upper part; stipules tubular, sub-scarious, truncate, obscurely toothed, sometimes persistent, 2 in. long. *Flowers* solitary, axillary or terminal, glabrous, sub-sessile, 3 to 4 in. long. *Calyx* tubular, tapering slightly to the base, truncate, sometimes split at one side, smooth or ribbed, from .4 to .65 in. long.

Corolla thick, many times longer than the calyx; the tube 1·75 to 2·5 in. long, narrowly cylindric, slightly over ·1 in. in diam., pubescent at the throat, otherwise glabrous; the limb 2 to 2·5 in. across, spreading, deeply divided into 6 to 9 obovate or obovate-oblong lobes. *Anthers* inserted in the throat, half-exserted, linear, ·3 in. long. *Style* thick; stigma exserted, with 2 thick short lobes. *Fruit* globose or ovoid-globose, obscurely ridged or smooth, 1 to 1·5 in. in diam., crowned by the tubular calyx; endocarp thick, hard; seeds rather large. Wall. Cat. 8266; DC. Prodr. IV. 381; Hook. f. in Flor. Br. Ind. III. 117; Miq. Fl. Ind. Bat. II. 230; Schumann in Bot. Tidsskrift Kobn. XXIV. 333; Koord. & Valet. Bijdr. VIII. 99. *G. resinifera*, Korth. in Ned. Kruidk. Arch. II. 191; Kurz in Journ. As. Soc. Beng. 1876, II. 134 (*non* Roth). *G. glutinosa*, Teysm. & Binnend. in Herb. Lugd. Bat.

Three forms of this, founded on variations in the calyx, may be recognised as under:—

Form 1. Calyx obconical, smooth, ·4 to ·5 in long, truncate.

PERAK: *Scortechini* 1775; *King's Collector* 5260, 5581. JOHOR: *Kelsall* 4088. SINGAPORE: *Wallich*. PENANG: *Maingay* (K.D.) 838. MALACCA: *Maingay* (K.D.) 838; *Griffith* (K.D.) 2816; *DISTRIB.* Sumatra, *Forbes* 3222; Borneo, *Motley* 341; *Beccari* 3250; Koh Chang in Siam; Java, *Teysmann*.

Form 2. Calyx-tube ribbed, ·4 to ·5 in. long.

PERAK: *Wray* 2522; *King's Collector* 6285. PENANG: *King's Collector* 1474; *C. Curtis* 686. SINGAPORE: *Cantley* 215; *Ridley* 2588, also *Lobb* 125.

Form 3. Calyx tubular, smooth, ·5 to ·65 in. long, split on one side.

JOHOR: *King's Collector* 11139. PAHANG: *Ridley* 375, 1388(?) The Johor specimen is well-marked, the other more doubtful.—*DISTRIB.* Borneo, *Curtis* 111.

6. *GARDENIA SPECIOSA*, Hook. fl. Fl. Br. Ind. III. 117. A glabrous tree 40 to 60 feet high; young branches much thicker than a goose-quill, pale, marked by the annular scars of the stipules. *Leaves* coriaceous, obovate- or oblanceolate-elliptic, shortly and abruptly acuminate, or cuspidate, the base much narrowed; both surfaces pale olivaceous-brown, glabrous except for some slight pubescence on the midrib and nerves; main-nerves 12 to 14 pairs, slightly curved, depressed on the upper but prominent on the lower surface as is the midrib; length 4 to 6 in.; breadth 1·5 to 3 in.; petiole ·5 to 1 in.; stipules tubular-sheathing, the mouth irregularly toothed. *Flowers* 4 to 6 in. long, coriaceous, solitary or in pairs, axillary, sessile. *Calyx*

·75 to 1·5 in. long, inflated-tubular, the mouth oblique, irregularly few-lobed. *Corolla-tube* cylindric, 3 to 3·5 in. long and about ·15 in. in diam. when dry; limb 2·5 to 3 in. across with 6 to 9 deep obovate-elliptic, blunt lobes. *Anthers* inserted in the villous throat, linear, ·4 in. long, half-exserted. *Fruit* globular, not ridged, 1·5 in. in diam., surmounted by the persistent tubular calyx-tube ·75 to 1 in. long. *Randia speciosa*, Hook. Ic. Pl. t. 824.

SINGAPORE: *Lobb.* PERAK: *Wray* 4265; *King's Collector* 4516, 5830, 8736, 10180.

7. GARDENIA GRIFFITHII, Hook. fil. Fl. Br. Ind. III. 118. A large shrub or small tree; young branches as thick as a goose-quill with pale bark marked by the annular cicatrices of the stipules, glabrous. *Leaves* thickly coriaceous, obovate-elliptic, cuspidate, much narrowed to the short petiole; upper surface olivaceous-brown, glabrous, shining, with the reticulations transverse and depressed; lower surface brown, puberulous especially on the stout midrib and 12 to 15 pairs of oblique slightly curved distinct main-nerve; length 5 to 9 in.; breadth 2·5 to 4 in.; petioles ·3 to ·4 in., stout, winged; stipules ·35 to ·4 in. long, with expanded irregularly toothed mouths. *Flowers* solitary, terminal or axillary, sessile, 4 to 4·5 in. long. *Calyx* nearly as long as the corolla-tube, coriaceous, tubular, expanding upwards, the mouth irregularly toothed, undulate, oblique, ·75 in. in diam., glabrous. *Corolla* salver-shaped, the tube cylindric, much narrower than the calyx; limb 3 in. across, with many lobes, imbricate in æstivation. *Fruit* woody, globular, when dry with slender vertical striæ, glabrous, 2 in. in diam., crowned by the very long, persistent calyx.

MALACCA: *Griffith* (K.D.) 2821; *Ridley* 223; *Derry* 1045. SINGAPORE: *Ridley* 6673; *Hullett* 611, 896.

VAR. *Maingayi*, Hook. fil. l.c. Mouth of the calyx irregularly cut into triangular coriaceous teeth.

MALACCA: *Maingay* (K.D.) 841.

27. PETUNGA, DC.

Glabrous shrubs or small trees with slender often 4-angled branches. *Leaves* petioled, narrowed to base and apex; stipules triangular or ovate-oblong. *Flowers* small, white, bi-bracteolate, in axillary spikes. *Calyx-tube* campanulate, with a persistent 4-lobed limb. *Corolla* funnel-shaped, its throat villous, the limb with 4 spreading lobes; lobes twisted in bud. *Anthers* 4, sub-sessile, linear, the connective thickened at the apex. *Ovary* 2-celled, but often incompletely so; style cylindric, with stoutly linear hairy stigmatic branches; ovules 2 to 8, pendulous from the apex of each cell. *Fruit* small, 2-celled. *Seeds*

imbricate; testa thick, grooved, rugulose; cotyledons linear.—DISTRIB. 4 or 5 species in Malaya and Northern India.

Rachis and bracteoles of the raceme, the calyx corolla and fruit externally and the midrib and main-nerves of the leaves beneath pubescent ... 1. *P. longifolia*.
Rachis and inflorescence glabrous, except the bracteoles and edges of the calyx-lobes:—

Fruit ellipsoid to ovoid, .2 to .25 in. long, its pedicel short; leaves narrowly oblong-lanceolate to lanceolate 2. *P. Roxburghii*.

Fruit clavate .5 to .75 long, mammillate at the apex, not ridged; leaves broadly elliptic-oblong ... 3. *P. venulosa*.

1. PETUNGA LONGIFOLIA, DC. Prod. IV. 399. A small tree; young branches almost as thin as a crow-quill, 4-angled, cinereous-puberulous at first, afterwards glabrous. *Leaves* membranous, oblong-elliptic, much tapered to both ends, glabrous except the midrib and main-nerves on the lower surface; both surfaces olivaceous-brown when dry; the lower conspicuously and transversely reticulate; main-nerves 6 to 8 pairs, slightly curved, ascending, thin but prominent on the lower surface, obsolete on the upper; length 4 to 5.6 in.; breadth 1.25 to 1.5 in.; petioles about .35 in., deciduously puberulous; stipules broadly triangular, acuminate, the midrib hairy, .2 in. long. *Racemes* at first not much longer than the petioles but afterwards lengthening much. *Flowers* .2 in. long, the pedicels at first very short but lengthening in fruit from .2 to .35 in., pubescent like the triangular bracteoles. *Calyx* funnel-shaped, less than .1 in. long, its mouth with 4 broad acute teeth. *Corolla* more than twice as long as the calyx, funnel-shaped, 4-lobed. *Fruit* clavate, crowned by the small calyx-limb, about .3 in. long when ripe, puberulous, the pedicel usually longer. Koord. & Valet. Bijdr. 8. 114. *Higginsia longifolia*, Blume MSS.

PENANG: *Phillips*, Wall. Cat. 8301a.; *Curtis* 2476, 2839; *Ridley* 10238; *King's Collector* 1447. PERAK: *Wray* 863, 1350; *Scortechini*; *King's Collector* 470, 4567, 7700; *Curtis* 3143 (in part). PAHANG: *Ridley* 2194.—DISTRIB. Sumatra.

This differs from *P. Roxburghii* in having all parts of the inflorescence hairy, and in having differently shaped fruits on long pedicels. It has also broader leaves, the under surfaces of which are pubescent on the midrib, main-nerves and conspicuously transverse reticulations.

2. PETUNGA ROXBURGHII, DC. Prod. IV. 399. An evergreen much-branched shrub 3 to 8 feet high; young branches 4-angled, cinereous when dry, thicker than a crow-quill. *Leaves* thinly coriaceous, oblong-lanceolate to lanceolate, tapering equally to each end; upper surface

olivaceous-brown, not reticulate; the lower rather darker faintly reticulate; main-nerves 8 to 10 pairs, spreading, faint on both surfaces; length 2·5 to 5 in.; breadth ·75 to 1·5 in.; petiole ·1 to ·2 in., stipules about one-third of the length of the leaves. *Racemes* more than 1 in. long, but shorter than the leaves, slender, glabrous. *Flowers* ·25 in. long, with several bracteoles at their bases. *Calyx* funnel-shaped, the limb with 4 broad triangular lobes. *Corolla* salver-shaped, glabrous except the villous throat; the mouth with 4 broadly oblong obtuse reflexed lobes. *Anthers* partly exerted from the throat. *Style* with two thick hairy arms. *Fruit* elliptic to ovoid, ·2 to ·25 in. long, glabrous, surmounted by the small calyx-limb; the pedicels very short. Hook. fil. Fl. Br. Ind. III. 120. *P. microcarpa*, DC. Prod. IV. 399. *P. variabilis*, Hassk. in Flora 1845, 232. *Higginsia microcarpa*, Blume Bijdr. 988. *Spicillaria Leschenaultii*, A. Rich. in Mem. Mus. Hist. Nat. Paris V. 252. *Randia racemosa* and *R. polysperma*, Roxb. Hort. Beng. 15; Fl. Br. Ind. I. 525, 527. *R. polysperma*, DC. l.c. 389. *Hypobathrum racemosum*, Kufz. For. Fl. Burm. II. 51. *Rubiacea*, Wall. Cat. 8302, 8312.

PERAK: *Curtis* 3143 (in part); *King's Collector* 1385, 2900; *Scortechini* 335, 1093. PENANG: *Curtis* 3387. PANGKOR: *Curtis* 1387. SINGAPORE: *Ridley* 1990. MALACCA: *Griffith*, *Ridley* 230. SELANGOR: *Ridley* 3187.—DISTRIB. Northern India; Burma; Java; Sumatra; Borneo.

VAR. *floribunda*. *Racemes* longer than the leaves, flowers very numerous; a tree.

PERAK: *King's Collector* 10023. JOHOR: *Ridley* 11157. SELANGOR: *Ridley* 3187.

It is probable that this should rank as a species.

3. PETUNGA VENULOSA, Hook. fil. Fl. Br. Ind. III. 121. All parts glabrous; young branches thicker than a crow-quill, somewhat compressed, shining, dark-coloured when dry. *Leaves* coriaceous, elliptic-oblong, shortly and rather abruptly acuminate, cuneate or rounded and sometimes slightly oblique at the base; both surfaces warm-brown when dry; main-nerves 6 or 7 pairs, slightly curved, ascending, thin but prominent on the lower surface like the midrib, and depressed on the upper; length 3 to 6 in.; breadth 1·5 to 3 in.; petioles ·2 to ·3 in.; stipules triangular, acuminate, keeled, as long as the petioles. *Racemes* at first only about 1 in. long, afterwards much longer. *Flowers* ·35 in. long, on short pedicels with one or two ovate-acute bracteoles at their bases. *Calyx* less than ·1 in. long, campanulate, the mouth with 4 broad blunt lobes hairy at the edge. *Corolla* ·3 in. long, funnel-shaped, the throat densely pubescent, otherwise glabrous, the limb

with 4 ovate-acute reflexed lobes. *Anthers* oblong, apiculate, partially exserted. *Style* with 2 thick hairy arms. *Fruit* clavate, slightly mammillate at the apex and much narrowed at the base when ripe, .5 to .75 in. long and .2 to .25 in. in diam. at the middle; pericarp leathery, endocarp woody.

PENANG: 8301 (in part); *Curtis* 762, 3386; *King's Collector* 1332. MALACCA: *Griffith* (K.D.) 2829; *Maingay* (K.D.) 911; *Holmberg* 774; *Derry* 1116. SINGAPORE: *Ridley* 8427. PERAK: *Wray* 500, 2315, 2487, 3386; *Ridley* 7183; *King's Collector* 1332, 2594, 3156; *Scortechini* 141, 1411.

The fruits of this species are often attacked by an insect and become .5 to 1.75 in length and .4 in. in diam. These galled-fruits are fusiform in shape and have 6 or 7 sharp vertical ridges and their apices are crowned by the slender much elongated calyx-tubes. They are moreover borne on peduncles nearly as long as themselves.

28. DIPLOSPORA, DC.

Shrubs or trees with shortly petiolate coriaceous leaves and triangular acuminate stipules. *Flowers* small, in axillary fascicles or small cymes, polygamo-dioecious, greenish or white; bracts free or connate in a cup. *Calyx* with short tube and truncate 4- or 5-toothed or -lobed limb. *Corolla* cylindric-campanulate or salver-shaped; the limb with 4 or 5 spreading lobes twisted in bud. *Stamens* 4 or 5, inserted by long or short filaments on the throat of the corolla; anthers oblong or linear, exserted, sub-basifixed, often recurved. *Ovary* 2-, rarely 3-celled. *Style* long or short, its branches linear or oblong; ovules 2 or 3 in each cell; placentas on the septum. *Berry* ovoid or globose; seeds few in each cell, imbricate; embryo small.—**DISTRIB.** Species about 16; tropical Asiatic and Malayan.

All parts quite glabrous:—

- | | | | | |
|--|-----|-----|-----|--------------------------|
| Leaves broadly elliptic, 6 or 7 in. long; fruit ovoid,
.85 in. long | ... | ... | ... | 1. <i>D. Beccariana.</i> |
| Leaves narrowly elliptic, 2.25 to 4.5 in. long; fruit
fusiform | ... | ... | ... | 2. <i>D. malaccense.</i> |

Nerves and midrib of leaves pubescent or puberulous on the lower surface:—

Leaves 6 to 11 in. long:—

- | | | | | |
|---|-----|-----|-----|------------------------|
| Leaves shortly caudate-acuminate, main-nerves 7
or 8 pairs; young branches deciduously pubescent | | | | 3. <i>D. Wrayi.</i> |
| Leaves with long narrow apical tail; main-nerves
10 to 12 pairs; young branches cinereous-tomen-
tose | ... | ... | ... | 4. <i>D. velutina.</i> |

Leaves usually under 6 in. in length:—

- | | | | | |
|--|-----|-----|-----|-------------------------|
| Leaves oblanceolate, their main-nerves 8 to 10
pairs; petioles .35 to .4 in. long | ... | ... | ... | 5. <i>D. Kunstleri.</i> |
|--|-----|-----|-----|-------------------------|

Leaves narrowly elliptic or elliptic-oblong, not
oblongate, their main-nerves 6 or 7 pairs; petioles

·15 to ·2 in. long 6. *D. pubescens.*

Imperfectly known species 7. *D. n. sp.?*

1. *DIPLOSPORA BECCARIANA*, King & Gamble n. sp. A glabrous tree 30 to 40 feet high; young branches compressed, thinner than a goose-quill. *Leaves* coriaceous, broadly elliptic, shortly and bluntly cuspidate, the base broad, rounded and slightly unequal; both surfaces pale olivaceous-brown when dry, shining (the lower the paler), with wide faint reticulations; main-nerves about 7 pairs, much curved, ascending, thin but distinct on both surfaces; length 6·5 to 7·5 in.; breadth 3·25 to 3·75 in.; petioles ·5 in.; stipules triangular, sub-acute, only ·15 in. long. *Flowers* not seen. *Fruit* ovoid, mammillate at the apex and tapered to the base, smooth, several-seeded; length ·85 in., breadth about ·2 in. when dry.

PERAK: *King's Collector* 6408.

A species badly represented in the Calcutta collections. It appears to be the same as Beccari's Bornean (Sarawak) plant Nos. 300 and 2062 and we have associated it with the name of that distinguished botanist and explorer.

2. *DIPLOSPORA MALACCENSIS*, Hook. fil. in Fl. Br. Ind. III. 124. A small tree; all parts quite glabrous; young branches rather thicker than a crow-quill, cinereous, glabrous. *Leaves* narrowly elliptic, shortly abruptly and obtusely acuminate, more or less narrowed at the base; upper surface brown when dry, the lower very pale-olivaceous; main-nerves 4 or 5 pairs, faintly prominent on the lower surface and slightly depressed on the upper; length 2·5 to 4·5 in.; breadth 1 to 2 in.; petioles ·15 to ·2 in.; stipules shorter than the petioles. *Flowers* ·2 in. long, in small clusters in the axils of fallen leaves; their pedicels short, bracteolate at the base, usually (*vide* Hook. fil.) unisexual. *Calyx* shorter than the corolla, tubular-campanulate, the mouth with 4 broad, coriaceous, acute teeth. *Corolla* thin, tubular, cut half-way down into 4 blunt oblong lobes. *Anthers* 4, narrowly ovate, sessile, half-exserted from the throat. *Fruit* fusiform, surmounted by the calyx, glabrous. *Lachnostoma triflorum*, Korth. in Ned. Kruidk. Arch. II. 202; Miq. Fl. Ind. Bat. II. 257.

In all the provinces; common.

3. *DIPLOSPORA WRAYI*, King & Gamble n. sp. A shrub or small tree; young branches half as thick as a goose-quill, cinereous, covered like the stipules and petioles with minute deciduous cinereous pubescence; all other parts save the interior of the corolla-tube glabrous. *Leaves* elliptic or elliptic-oblong, often somewhat obovate, shortly caudate-acuminate, the base cuneate; both surfaces pale

olivaceous-green when dry, the lower the paler; main-nerves 7 or 8 pairs, curved, ascending, thin but prominent on the lower surface, faint on the upper; length 6 to 11 in.; breadth 2·5 to 4·75 in.; petioles ·25 to ·4 in.; stipules shorter than the petioles, broadly ovate, acuminate, keeled. *Flowers* ·25 in. long, in dense shortly peduncled or sessile axillary minutely bracteolate fascicles a little longer than the petioles. *Calyx* very short, cupular, with 4 broad shallow teeth. *Corolla* tubular, slightly inflated above the middle; the tube villous inside; the lobes of the limb shorter than the tube, glabrous, imbricate, oblong, sub-acute. *Anthers* sessile in the tube ·1 in. long oblong. *Style* cylindric, as long as the corolla, divided into 2 linear hairy arms; ovary with 2 bi-ovulate cells. *Fruit* globular-ovoid, crowned by the faint scar of the calyx, glabrous, ·4 in. long, and about ·3 in. in diam.

PERAK: *Wray* 60, 2879, 3469; *Ridley* 5544; *King's Collector* 2366, 2697, 2782, 5277, 6253.

This closely resembles specimens in Herb. Kew. named *Vangueria palembanica* Teysm. & Binn. which is a *Diplospora*.

4. *DIPLOSPORA VELUTINA*, King & Gamble n. sp. A small tree; young branches half as thick as a goose-quill, densely covered with short dark-cinereous tomentum like the stipules and petioles. *Leaves* coriaceous, oblong-elliptic, sometimes slightly obovate, the apex abruptly contracted into a narrow acute point about 1 in. long, the base rounded or slightly narrowed; upper surface glabrous, shining, the midrib and main-nerves depressed; the lower with bulbous-based hairs in the interspaces between the nerves; main-nerves 10 to 12 pairs, slightly curved, ascending, stout, the latter as well as the bold midrib and transverse curved veins very pubescent; length 8 to 10 in.; breadth 3 to 4·5 in.; petioles about ·2 in.; stipules about as long as the petioles, keeled, triangular, very acuminate. *Flowers* ·25 in. long, sessile, in dense sessile axillary heads not much longer than the petioles. *Calyx* very short, cupular, obscurely lobed. *Corolla* funnel-shaped, glabrous except the densely villous throat; the limb with 4 oblong, broad, slightly emarginate lobes. *Anthers* sagittate. *Style* slender, with 2 short, linear, compressed stigmatic lobes. *Fruit* unknown.

PERAK: *King's Collector* 3142.

5. *DIPLOSPORA KUNSLERI*, King & Gamble n. sp. A small tree; young branches thinner than a goose-quill, deciduously puberulous like the stipules, petioles, and lower surfaces of the midrib and main-nerves, otherwise glabrous. *Leaves* sub-coriaceous, oblanceolate to elliptic or oblong, shortly, abruptly, and bluntly acuminate, the base rounded or slightly cuneate; both surfaces of rather a dark-brown

when dry; the midrib impressed on the upper, prominent on the lower; main-nerves 8 to 10 pairs, oblique, little curved, prominent beneath; veins transverse, thin but distinct on the lower surface length 6 or 7 in.; breadth 1.75 to 2.5 in.; petioles .35 to .4 in. long; stipules about as long as the petioles, triangular-lanceolate, keeled, produced into a long narrow point. *Cymes* small, shortly peduncled, axillary. *Flowers* not seen. *Fruit* mamillate when young, ovoid and crowned by the small calyx-scar when ripe, smooth, .4 in. long; 2-celled, 2-seeded.

PERAK: *Scortechini* 298; *King's Collector* 3211.

6. DIPLOSPORA PUBESCENS, Hook. fil. Fl. Br. Ind. III. 124. A shrub; young branches thicker than a crow-quill, compressed, minutely pubescent like the stipules and petioles. *Leaves* coriaceous, narrowly elliptic or elliptic-oblong, shortly and obtusely caudate-acuminate, the base cuneate; both surfaces when dry pale-brown, the upper everywhere glabrous and the midrib and main-nerves channelled; the lower glabrous between the minutely pubescent stout midrib and 6 or 7 pairs of slightly curved slender but prominent main-nerves; length 3 to 6 in.; breadth 1.25 to 2.25 in.; petioles .15 to .2 in.; stipules about as long as the petioles, narrowly lanceolate, tapering into long subulate points. *Flowers* about .2 in. long, in dense short axillary sub-sessile heads slightly longer than the petioles. *Calyx* short, with 4 very small blunt lobes, pubescent. *Corolla* longer than the calyx, tubular, lobes of limb 4, short, the throat villous. *Fruit* ovoid-globular, smooth, the calyx scar small; length .4 in.; seeds 4. Wall, Cat. 8297.

PERAK: *Scortechini* 6, 94; *Ridley* 5537.—DISTRIB. Mergui, *Griffith* 1108; *Helfer* (Kew. Dist. 2799).

Imperfectly known species.

7. DIPLOSPORA, n. sp.? Young branches thicker than a crow-quill, densely and minutely cinereous-pubescent. *Leaves* coriaceous, narrowly elliptic, shortly and somewhat bluntly caudate-acuminate, the base slightly narrowed; both surfaces dark-brown when dry; the upper shining, glabrous, lower dull, puberulous on the bold midrib and 6 or 7 pairs of prominent oblique little curved main-nerves; length 4.5 to 5.5 in.; breadth 1.5 to 2.35 in.; petioles .15 to .2 in.; stipules about as long as the petioles, triangular, sub-acute or acute but not acuminate. *Flowers* not seen. *Fruit* ovoid-globular, crowned by the small calyx-scar, smooth, .45 in. long, and .35 in. in diam.

PERAK: at an elevation of 5,000 feet; *Wray* 4086.

29. SCYPHIPHORA, Gaertn.

A small tree with stout terete nodose branches, gum-yielding when young; all parts except the inside of the corolla-tube glabrous.

Leaves coriaceous, obovate, obtuse; stipules short, broad. *Flowers* small, in dense, shortly-pedunculate cymes. *Calyx-tube* elongate-obconic; the limb cupular, truncate, minutely 4- or 5-toothed, persistent. *Corolla-tube* cylindrical; the throat dilated and villous; the limb with 4 or 5 oblong lobes twisted in bud. *Stamens* 4 or 5, inserted by short filaments between the lobes of the corolla, anthers linear, sagittate. *Disk* annular, lobed. *Ovary* with 2 narrow cells; style filiform, with 2 linear obtuse stigmatic branches. *Ovules* 2 in each cell, attached to the middle of the cell, one pendulous, the other ascending; the contiguous funicles dividing each cell into 2 chambers. *Drupe* sub-cylindrical, 8- to 10-grooved and winged, separating into 2 crustaceous 4- to 5-ribbed pyrenes. *Seeds* sub-cylindrical; testa membranous; albumen scanty; cotyledons oblong.—**DISTRIB.** A single species in Malaya and Ceylon.

SCYPHIPHORA HYDROPHYLLACEA, Gaertn. Fruct. III. 91. t. 196. A miniature evergreen tree, with a spherical crown and simple stem hardly exceeding 4 feet in height. *Leaves* acute at the base on a petiole .5 to 1 in. long; nervation obsolete; length about 2 in.; breadth 1.5 in. *Flowers* whitish often tinged with red; collected in small dichotomously branched axillary cymes. *Calyx* about .15 in. long. *Corolla-tube* about as long as the calyx and its lobes half as long. *Drupe*s elliptically oblong, about .35 in. long. DC. Prod. IV. 577; Kurz. Fl. Burm. II. 4; Hook. fil. Fl. Br. Ind. III. 125; Miq. Fl. Ind. Bat. II. 239; Koord. & Valet. Bijdr. 8. 125; Trimen Fl. Zeyl. III. *Epethenia malayana*, Jack in Mal. Misc. I. 12; Wall. Cat. 8444; DC. l.c. 478; W. & A. Prod. 424. *Epithenia* sp., Griff. Notul. IV. 269; Ic. Pl. Asiat. 478 and 644 A. (*Lumintzera*). *Rubiacea*, Wall. Cat. 9055 A. *in part.*

In Mangrove swamps.—**DISTRIB.** Coasts of S. India and Ceylon; Andaman Islands; Malay Archipelago to N. Australia; Philippines and New Caledonia.

30. JACKIA, Wall.

A tall tree; young branches stout, obtusely 4-angled, covered by the persistent bases of the fallen leaves and by the large coriaceous, sheathing long-bristled stipules. *Leaves* coriaceous, large. *Flowers* densely pubescent, in prominently bracteolate scorpioid cymes arranged corymbosely in long-peduncled pendulous axillary panicles. *Calyx-tube* small, obconic, the limb with 5 unequal lobes, two of them small the other 3 coriaceous, large, veined, accrescent and forming wings to the ripe fruit. *Corolla* funnel-shaped, the tube narrow, sub-glabrous inside, lobes of the limb 5, valvate in bud, triangular. *Anthers* 5, linear, sub-sessile in the throat, the connective apiculate. *Disk* hairy. *Ovary*

2-celled, ovules 2 in each cell, attached to the apex of an erect basilar placenta. *Style* compressed, slender, long-exserted, thickened and hairy about the middle, stigmatic-lobes 2, short. *Fruit* dry, indehiscent, obconic, .1 in. long, densely hairy, crowned by 3 accrescent, persistent, veined, oblong somewhat oblanceolate blunt calyx-lobes about .6 in. long; *seeds* (by abortion) solitary, ellipsoid, embryo straight in the axis of much fleshy albumen; cotyledons broad, flat.—DISTRIB. A single Malayan species.

JACKIA ORNATA, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 321. Young branches as thick as the little finger. *Leaves* oblanceolate, the apex sub-acute, narrowed from above the middle to the short stout petiole; upper surface glabrous and shining, the lower adpressed-puberulous; main-nerves about 12 pairs, prominent beneath; length 6 to 12 in.; breadth 2.5 to 5 in.; petiole .4 to .9 in.; stipules widely and deeply cupular, often 1 inch or more in length (to the end of the hairy bristles). *Flowers* .4 in. long; corolla many times longer than the calyx-tube, twice as long as the calyx-lobes when young, densely sericeous externally; bracteoles broadly oblong-ovate, shorter than the flowers, imbricate, sericeous, the lower ones sometimes connate. Wall. Pl. As. Rar. t. 293; Wall. Cat. 6284; DC. Prod. IV. 621; Hook. fil Fl. Br. Ind. III. 126; Miq. Fl. Ind. Bat. II. 237.

In all the provinces.—DISTRIB. Malay Archipelago.

A first note on the Life-History of Chermes abietis-piceæ Steb. MS.—By
E. P. STEBBING.

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In a paper read before the Members of this Society in April last I gave an account of the mode of development of the alar appendages of the Spruce form of *Chermes abietis piceæ*, Steb. MS.* I propose to describe here in detail the further observations I have been able to make up to the present on the life-history of this exceedingly interesting insect. In order to make the somewhat complicated stages of life passed through understood, and the subsequent parts of this paper intelligible, it will be first necessary to give some short description of the various forms this insect assumes in its different generations.

* Vide No. 2, p. 57 of this Volume.